Introduction At www.progressinmathematics.com, you will find a lot of technology resources that you can use at home, and your teacher may make them available when you are at school.

Technology Resources:

**Audio Glossary**
- From A to Z  Find the meanings and hear the pronunciations of math words and phrases.

**Alternative Teaching Models**
- Tutorials  Watch and listen to these animated math lessons.

**Virtual Manipulatives**
- Manipulatives  Practice and model math concepts with virtual manipulatives.

**Practice**
- Problem of the Day  Tackle a new problem every day!
- Skills Update  Review your skills with Lesson and Practice pages.
- Math Minutes  Race against the clock with timed activities!
- Practice Activities  Practice makes perfect with these fun activities!
- Vocabulary Activities  Review your math vocabulary while playing Hangman or Word Scramble.

**Enrichment**
- Activities  Challenge yourself with these interactive activities.

**Math Alive At Home**
- Take-Home Activities  Share your math experience at home!
If you are not sure what a certain word means or how to pronounce it, use your online Audio Glossary. The glossary is easy to use. Just choose your grade level and the first letter of the term you want to review.

Choose the first letter of a term you want to review.

Click on the term.

Listen as the glossary pronounces the word.

**Factors**

(FAK-turz)

Two or more numbers that are multiplied to give a product.
Click **Tutorials**. If there is a skill or concept that you need help with or do not understand, review the animated Alternative Teaching Models (there are 2 for each chapter). Each Alternative Teaching Model gives a step-by-step explanation of one of the skills or concepts in the chapter.
Click **Manipulatives**. Virtual Manipulatives are visual models that you can actually move or manipulate to show what is happening. You can use these tools to build numbers, rotate shapes, and even jump on a number line.

Select your grade and the chapter you are working on. The manipulatives that are listed will be ones that you can use to visualize the concepts of the chapter.
Click **Practice Activities.** There is an interactive activity for each chapter in your textbook. The activity practices the most important skills of the chapter. Use the activity while you are learning the skills, or come back to it later to review.

Click **Math Minutes.** You can practice your basic facts as well as compute with larger numbers to see how accurately you can compute if you are given a time limit.

Click **Vocabulary Activities.** In each chapter, you will be learning new math terms that you will need to know. A good way to review these terms is to play either the Hangman game or Word Scramble in your online vocabulary activities.
Click **Problem of the Day**.*
Sharpen your problem-solving skills every day.
Print and solve one problem each day!

Click **Skills Update**.*
Print Skills Update lessons and practice pages to review previously taught math skills and concepts.

**ENRICHMENT**

Click **Activities**.
The Enrichment activities online are topics that go beyond what you are learning in class.
Each activity starts with a page that explains the concept and then gives you time to practice the concept.

---

*Whiteboard projectable only.*
Dear Family,

Today our class began Chapter 1. We will learn about place value. Let’s do the activity below together so I can review the skills I will need in order to understand the math in this chapter. Then we can read some of the new vocabulary I will learn in Chapter 1.

Love, ____________________

How Many Tens, How Many Ones?

With your child, list the age of everyone in your family on a sheet of paper. Ask your child to say how many tens and how many ones there are in each age. Draw a frame like the one at the right for each family member. Tell your child to write in each frame the number of tens and ones for each age. Then have her/him write an addition with the number of tens and the number of ones for each age, and find the sum.

expanded form
shows the place value of the digits
600
40
7
standard form
647

nearest ten
the number achieved after rounding to the nearest ten
251
250
nearest hundred
the number achieved after rounding to the nearest hundred

Dear Family,

Today our class completed Chapter 1. We learned how to read, write, compare, and order numbers to hundred thousands. These skills are needed to work with numbers and to understand place value. We explored patterns of skip counting with 2s, 3s, 4s, 5s, and 10s, which will help us to learn multiplication facts. We practiced rounding 3- and 4-digit numbers to the nearest ten, hundred, or thousand. This skill is necessary for estimating with numbers. We also worked with money, which will help us make and count change.

Love, ____________________

Key Skills and Concepts

Students’ learning in Chapter 1 was guided by giving particular emphasis to the following key skills and concepts:

• Identify the place value for each digit to numbers to 10,000.

At Home Activities

Click Take-Home Activities. Keep your family involved in what you are learning. For each chapter, there are two letters to your family. Use the first letter at the beginning of the chapter, to review previously learned skills with a family activity, and read about the new skills you will learn. The second letter tells your family about the skills you learned in the chapter and has another fun activity that you and your family members can do together.

Both letters are in English and in Spanish.
Progress in Mathematics

Authors
Catherine D. LeTourneau
Alfred S. Posamentier

Program Consultants
Madelaine Gallin
Former Math Coordinator
Community School District #6
New York, NY

Frank Lucido
Associate Professor in
Bilingual/Multicultural Education
Texas A&M University
Corpus Christi, TX

Lucy Lugones
Math Coordinator
St. Luke’s School
Whitestone, NY

Tim Mason
Title 1 Specialist
Palm Beach County School District
West Palm Beach, FL

R. James Milgram
Professor of Mathematics
Stanford University
Palo Alto, CA

Rosalie Pedalino Porter
Consultant Bilingual/ESL Programs
Amherst, MA

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www.sadlier-oxford.com
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Reviewers

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Grades 3-6 Reviewers

Madonna Atwood  
Teacher  
St. Louis, MO

John Palladino  
Professor at Eastern Michigan University  
Ypsilanti, MI

Debra Wright  
Principal  
Winter Haven, FL

Judith A. Devine  
Education Consultant  
Springfield, PA

Stephanie D. Garland  
Education Consultant  
St. Louis, MO

Grade-Level Reviewers

Marie Bicsak  
Math Coordinator  
Mt. Clemens, MI

Sara Kobylarz  
Grade 3 Teacher  
Bronx, NY

Br. Ralph Darmento, F.S.C.  
Deputy Superintendent of Schools  
Newark, NJ

Suzanne Ryan  
Grade 4 Teacher  
Orono, MN

Candace Govin  
Grades 4–8 Math Teacher/Coordinator  
Plantation, FL

Sr. Adriana Cernoch  
Grade 6 Teacher  
Dallas, TX

Brandy Roth  
Grade 3 Teacher  
Kissimmee, FL

Elizabeth M. Johnson  
Grade 5 Teacher  
Bettendorf, IA

Linda Hamby  
Grade 5 Teacher  
DesPeres, MO

Barbara Murphy  
Grade 4 Teacher  
Chesterfield, MO

Sr. Martha Carmody, O.P.  
Grade 4 Teacher  
Springfield, IL

Jacqueline A. Byrd  
Grade 5 Teacher  
Chesterfield, MO

Sr. Maristella Dunlavy, O.P.  
Principal  
Springfield, IL

Jeannine Frey  
Grade 3 Teacher  
Chesterfield, MO

Mary E. Stokes  
Grade 5 Teacher  
Oak Forest, IL
Progress in Mathematics, now in its fifth decade of user-proven success, is a complete basal mathematics program. Written by experienced teacher-authors, it integrates a traditional course of study and today’s academic Standards with the most up-to-date methods of teaching.

Progress in Mathematics is designed to meet the individual needs of all learners. Teachers who use Progress come to understand that students may progress as quickly as they can or as slowly as they must.

In Grade 3, the concepts of multiplication and division will be further developed as well as addition and subtraction of larger numbers, and your third grader will be introduced to decimals. There will also be an increased emphasis on algebraic thinking. Other topics that are studied include: statistics, geometry, measurement, probability, and fractions. Special attention is given to critical thinking, problem solving, mental math, and journalizing.

But overall success in achieving the goals of this program depends on ongoing teacher-family-student interaction. It is important for you to encourage your third grader to achieve success in mathematics and enjoy it as well. You can help your student see math as useful and practical by relating it to everyday situations. It is also helpful to provide a quiet space and time for homework, and to reinforce the idea that by practicing math concepts and skills in your home environment, your student can have fun while learning mathematics.

Throughout the school year, you and your student can access Math Alive At Home pages on the sadlier-oxford.com Web site. These pages include the math vocabulary of each chapter plus fun-filled activities that will help you relate the math your student is learning in school to the real world.

We know that by using Progress in Mathematics your third grader will not only learn to value math, but become a confident problem solver and learn to reason and communicate mathematically as well.
Skills Update
A handbook for reviewing essential and previously taught skills

Letter to the Family

Introduction to Skills Update

Numeration
I  Expanded Form
II  Count by 2s, 5s, 10s

Money
I  Money Less Than $1.00

Whole Number Operations
I  Addition Facts Through 18
II  Subtraction Facts Through 18
III  Mental Math Strategies
IV  Patterns

Fractions
I  Fractions: Parts of a Whole
II  Fractions: Parts of a Set

Measurement
I  Nonstandard Units
II  Inch and Centimeter
III  Cup, Pint, Quart
IV  Liter
V  Hour, Half Hour
VI  A.M., P.M.

Geometry
I  Sides and Vertices
II  Solid Figures

Statistics
I  Venn Diagrams
II  Read a Pictograph
III  Read a Bar Graph

Probability
I  Certain, Possible, Impossible
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Develops concept or skill with manipulatives. Lesson promotes algebraic reasoning.
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*Develops concept or skill with manipulatives.  
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★Develops concept or skill with manipulatives. [Algebra] Lesson promotes algebraic reasoning.
Progress in Mathematics includes a “handbook” of essential skills, Skills Update, at the beginning of the text. These one-page lessons review skills you learned in previous years. It is important for you to know this content so that you can succeed in math this year.

If you need to review a concept in Skills Update, your teacher can work with you, using manipulatives, which will help you understand the concept better.

The Skills Update handbook can be used throughout the year to review skills you may already know. Since many lessons in your textbook refer to pages in the Skills Update, you can use a particular lesson at the beginning of class as a warm-up activity. Or your class may choose to do the Skills Update lessons at the beginning of the year so that you and your teacher can assess your understanding of these previously learned skills.

You may even want to practice specific skills at home. If you need more practice than what is provided on the Skills Update page, you can use the practice pages available online at www.sadlier-oxford.com. These practice pages have an abundance of exercises for each one-page lesson.
Expanded Form

A place-value chart can help you write numbers in expanded form, a way to write a number that shows the place value of each of its digits.

Think

- 3 tens = 30
- 8 ones = 8

30 + 8 is the expanded form of 38.

Think

- 2 tens = 20
- 0 ones = 0

20 + 0 is the expanded form of 20.

Complete. Write each number in expanded form.

1. 4 tens 1 one = __
   __ + __

2. 6 tens 3 ones = __
   __ + __

3. 2 tens 2 ones = __
   __ + __

4. 5 tens 7 ones = __
   __ + __

5. 7 tens 6 ones = __
   __ + __

6. 9 tens 5 ones = __
   __ + __

7. 1 ten 4 ones = __
   __ + __

8. 4 tens 8 ones = __
   __ + __

9. 7 tens 0 ones = __
   __ + __

10. 3 tens 3 ones = __
    __ + __

11. 8 tens 9 ones = __
    __ + __

12. 6 tens 0 ones = __
    __ + __
Count by 2s, 5s, 10s

You can count whole numbers: 0, 1, 2, . . .

Count by 2s.
Start at zero. Count by 2s to 20.

0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
These numbers are called even numbers.
Even numbers end with the digits 0, 2, 4, 6, or 8.

Start at one. Count by 2s to 21.

1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21
These numbers are called odd numbers.
Odd numbers end with the digits 1, 3, 5, 7, or 9.

Count by 5s to 50.
0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

Count by 10s to 100.
0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

Count by 2s, 5s, or 10s.
1. Count by 2s.
   Start at 12.
   End at 26.
2. Count by 2s.
   Start at 21.
   End at 35.
3. Count by 5s.
   Start at 15.
   End at 40.
4. Count by 10s.
   Start at 40.
   End at 80.
Donna has these coins. How much money does she have?

Count on: 50¢ 75¢ 85¢ 90¢ 91¢ 92¢

Donna has 92¢, or $.92.

Arrange coins in order.

Write the amount shown in two ways. First use the cent sign (¢). Then use the dollar sign ($) and decimal point (・).

1. 2.

3. 4.
Addition Facts Through 18

Add: $9 + 4 = ?$

Think
Nine in the first addend.
Count on: 10, 11, 12, 13.

You can use the number line to add.

Start at 0. Go to 9.
Count on 4.

You can use the number line to add.

Add. You may use a number line.

1. $1 + 2$
2. $5 + 3$
3. $4 + 5$
4. $3 + 3$
5. $2 + 7$
6. $2 + 4$
7. $7 + 8$
8. $3 + 7$
9. $6 + 5$
10. $9 + 4$
11. $4 + 8$
12. $6 + 6$
13. $6 + 1$
14. $0 + 9$
15. $5 + 2$
16. $8 + 6$
17. $7 + 9$
18. $5 + 6$
19. $8 + 3$
20. $9 + 9$
21. $6 + 4$
22. $8 + 2$
23. $6 + 9$
24. $7 + 7$
25. $0 + 3$
26. $1 + 9$
Subtraction Facts Through 18

Subtract: $13 - 4 = ?$

You can use the number line to subtract.

If you subtract zero from a number, the difference is the number.

If you subtract a number from itself, the difference is zero.

Subtract. You may use a number line.

1. $6 - 3$
2. $10 - 4$
3. $3 - 2$
4. $12 - 8$
5. $11 - 2$
6. $18 - 9$
7. $14 - 6$
8. $8 - 0$
9. $7 - 7$
10. $12 - 3$
11. $16 - 8$
12. $10 - 5$
13. $9 - 5$
14. $6 - 4$
15. $16 - 7$
16. $15 - 6$
Mental Math Strategies

You can use doubles to add and subtract mentally.

**Doubles Plus 1**

Add: $8 + 7 = ?$
Think: $7 + 7 = 14$

1 more than $7 + 7$ $8 + 7 = 15$

Subtract: $15 - 7 = ?$
Think: $14 - 7 = 7$

1 more than $14 - 7$ $15 - 7 = 8$

**Doubles Minus 1**

Add: $4 + 5 = ?$
Think: $5 + 5 = 10$

1 less than $5 + 5$ $4 + 5 = 9$

Subtract: $9 - 5 = ?$
Think: $10 - 5 = 5$

1 less than $10 - 5$ $9 - 5 = 4$

You can use fact families to subtract mentally.

Subtract: $11 - 6 = ?$

Think...

$6 + 5 = 11$ So $11 - 6 = 5$.

Remember the fact family for 5, 6, and 11.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>+</th>
<th>+</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5</td>
<td>11</td>
<td>11</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

You can use fact families to subtract mentally.

Subtract: $11 - 6 = ?$

Think...

Look for doubles.
Add: $4 + 4 + 5 = ?$

Think...

$4 + 4 + 5 = 13$

8 $8 + 5 = 13$

Look for sums of ten.
Add: $8 + 3 + 7 = ?$

Think...

$8 + 3 + 7 = 18$

10 $8 + 10 = 18$

4. $11 - 6$
5. $3 + 7 + 9$
6. $9 + 1 + 8$
7. $6 + 4 + 6$

Add or subtract mentally.
Tell the strategy that helped you find the answer.
Patterns

Some sets of numbers can form a pattern.

Find the next number in the pattern.

95, 85, 75, 65, ?

**Identify the rule:** Start at 95. Then subtract 10. \((-10)\)

\[
\begin{array}{cccccc}
95 & 85 & 75 & 65 & ? \\
\downarrow & \downarrow & \downarrow & \downarrow & \\
-10 & -10 & -10 & -10 & \\
\end{array}
\]

**Apply the rule:** \(65 - 10 = 55\)

So the next number in the pattern is 55.

Find the next number in the pattern.

18, 22, 21, 25, 24, 28, ?

**Identify the rule:** Start at 18. Add 4, then subtract 1. \((+4, -1)\)

\[
\begin{array}{ccccccc}
18 & 22 & 21 & 25 & 24 & 28 & ? \\
\uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \\
+4 & +4 & -1 & +4 & -1 & -1 & \\
\end{array}
\]

**Apply the rule:** \(24 + 4 = 28, 28 - 1 = 27\)

So the next number in the pattern is 27.

Look for a pattern. Find the next number.

1. 30, 35, 40, 45, 50, ?
2. 30, 27, 24, 21, 18, ?
3. 12, 22, 32, 42, 52, ?
4. 53, 51, 49, 47, 45, ?
5. 4, 8, 5, 9, 6, 10, ?
6. 15, 25, 20, 30, 25, 35, 30, ?
7. 12, 15, 14, 17, 16, 19, ?
8. 27, 25, 28, 26, 29, 27, 30, ?
Fractions: Part of a Whole

- A fraction can name part of a whole.

  Count the number of equal parts shaded blue: 3

  Count the total number of equal parts: 4

  To tell the part of the whole shaded blue, write the fraction \( \frac{3}{4} \).

  Read \( \frac{3}{4} \) as: three fourths.

  Word name: three fourths

- Each figure is divided into equal parts. The number of equal parts names the fractional parts.

Write the fraction and word name for the shaded part of each figure.

1.

2.

3.
Fractions: Part of a Set

Fractions can name part of a set or groups of objects.

\(\frac{4}{9}\) of the buttons are purple.

\(\frac{5}{9}\) of the buttons are green.

Write the fraction for the part of each set that is shaded. Then write the fraction for the part that is not shaded.

1. Write the fraction for each.

2. What fractional part of the flowers is purple?
3. What fractional part of the flowers is not purple?
4. What fractional part of the flowers is drooping?
5. What fractional part of the flowers is not drooping?
Nonstandard Units

You can measure length with units such as paper clips.

This pencil is about 4 small paper clips long.

Write about how many small paper clips long each picture is.

1.

2.

Measure each real object.
Write about how many small paper clips long each is.

3.

4.

Answer each question. Then measure.

5. Which do you think is longer, your math book or a new pencil?

6. To measure the length of a table, would you use more paper clips or more new pencils? Explain.

7. Which unit would you use, paper clips or cubes, to measure the weight of an apple? Explain.
Inch and Centimeter

The **inch** (in.) is a customary unit used to measure length.

The inch can be used to measure small objects.

The length of a small color paper clip is *about* 1 inch (1 in.)

A small color paper clip is a benchmark for an inch.

A **benchmark** is an object of known measure that can be used to estimate the measure of other objects.

The **centimeter** (cm) is a metric unit used to measure length.

The centimeter can be used to measure small objects.

The width of a large paper clip is *about* 1 centimeter (1 cm). This is a benchmark for a centimeter.

**Estimate how long each is. Then measure with an inch ruler.**

1. 
2. 

**Draw a line for each length.**

3. 3 cm  
4. 7 cm  
5. 12 cm  
6. 10 cm
Cup, Pint, Quart

The cup (c), pint (pt), and quart (qt) are customary units used to measure liquids.

1 cup

1 pint

1 quart

2 c = 1 pt

2 pt = 1 qt

Do the pictures show the same amount? Explain your answer.

1. 

2. 

3. 

Measurement III
**Liter**

The liter is a metric unit used to measure liquids.

About how much does each real object hold? Write *less than 1 liter*, *about 1 liter*, or *more than 1 liter*.

1. [Image of a cup] about 2 liters
   - less than 1 liter
   - about 1 liter
   - more than 1 liter

2. [Image of a thermos] about 2 liters
   - less than 1 liter
   - about 1 liter
   - more than 1 liter

3. [Image of a trash can] about 20 liters
   - less than 1 liter
   - about 10 liters
   - more than 1 liter

4. [Image of a bucket] about 40 liters
   - less than 1 liter
   - about 10 liters
   - more than 1 liter

About how much does each real object hold? Write the better estimate.

5. [Image of a bucket] about 2 liters
   - about 1 liter
   - about 10 liters

6. [Image of a vase] about 1 liter
   - about 10 liters
   - about 40 liters

7. [Image of a pot] about 20 liters
   - about 1 liter
   - about 10 liters

8. [Image of a watering can] about 4 liters
   - about 1 liter
   - about 10 liters
Hour, Half Hour

The short hand on a clock tells the hour (h). The long hand tells how many minutes (min).

1 hour = 60 minutes
1 h = 60 min

Read this time as: two o’clock.
Write in standard form as: 2:00.

There are 30 minutes in one half hour.
Read this time as: two thirty,
or half past two,
or thirty minutes after two.

Write in standard form as: 2:30.

Write the time in standard form.

1. 2. 3.

Draw the time. Show the hour and minute hands.

4. 5. 6. 7.

8. four o’clock 9. six o’clock 10. half past 8 11. six thirty
A.M. and P.M.

Using A.M. and P.M. after a time helps people know whether the time is day or night.

The letters **A.M.** show the 12 hours from 12 midnight to 12 noon. The letters **P.M.** show the 12 hours from 12 noon to 12 midnight.

12:00 in the day is noon. You might be eating lunch at noon.
12:00 at night is midnight. You are probably sleeping at midnight.

**Write the time, using A.M. or P.M.**

1. get ready for school
2. go to the store
3. eat a snack
4. the moon shines
5. feed the dog
6. play soccer

7. Write the time a half hour before midnight.
8. Write the time a half hour after noon.
9. Name something you do at 10 A.M. and something you do at 10 P.M.
10. Write the time that your school begins and the time that your school ends.
Sides and Vertices

A **side** is a straight **line** that bounds a closed figure.

The point where two sides meet is called a **vertex** (corner).

A **triangle** has 3 sides and 3 vertices.

A **circle** is a closed flat figure with 0 sides and 0 vertices.

Name each figure. Then write the number of straight sides and the number of vertices each has.

1. ![](image1)
2. ![](image2)
3. ![](image3)

Draw each closed figure. You may use dot paper.

4. 5 sides
5. 6 vertices
6. 4 sides
Solid Figures

Solid figures are not flat.

cube
pyramid
rectangular prism
cylinder
sphere
cone

curved surface

Write the name of the solid figure each object is shaped like.

1.  
2.  
3.  

4.  
5.  
6.  

7. Name some objects in the classroom, home, or outdoors that have the shape of solid figures.
Venn Diagrams

Bill surveyed his friends to find whether they liked cats or dogs as pets. Then Bill made a Venn diagram to show the results.

A Venn diagram uses circles that overlap to show when data is shared.

Use the diagram to answer these questions.

1. Which of Bill’s friends like only dogs as pets?
2. How many of Bill’s friends like only cats?
3. Which of Bill’s friends like both dogs and cats as pets?
4. How many friends did Bill survey?
5. If Bill’s new friend Mandy says she likes both cats and dogs as pets, where would Mandy’s name be written?
6. Survey 10 of your friends. Ask whether they like dogs or cats better as pets. Record your data. Draw a Venn diagram like the one above, and show your results.
Read a Pictograph

A pictograph is a graph that represents data in picture form.

The pictograph shows the number of books each student read during summer break.

The key in a pictograph tells how many each picture represents.

Use the key to find how many books each student read.

Count by 2s or add.

Jamal:

\[
\begin{align*}
A & \quad A \\
A & \quad A \\
\end{align*}
\]

\[
2 + 2 + 2 + 2 = 8
\]

Jamal read 8 books during summer break.

Use the pictograph to solve each problem.

1. How many books did Lisa read? How many did Ashley read?

2. Who read the most books? Who read the fewest books?

3. How many more books did Jamal read than Ashley?

4. How many fewer books did Ashley read than Lisa?
Read a Bar Graph

A **bar graph** is a graph that uses bars of different lengths to show data.

This bar graph shows the number of students who named each sport as their favorite to watch.

How many students prefer to watch ice skating?

Look at the end of the bar labeled *ice skating*. The bar ends at the 2 mark.

So 2 students named ice skating as their favorite sport to watch.

**Use the bar graph to solve each problem.**

1. What is the title of the bar graph?
2. What do the labels tell you about the graph?
3. How can you find which sport is preferred by the most number of students? preferred by the least number of students?
4. How many students prefer to watch football? baseball? gymnastics?
Certain, Possible, Impossible Outcomes

The yellow spinner at the right has 4 equal sections marked 0, 1, 2, and 3. These numbers are called outcomes.

An outcome is possible if it might happen. It is possible to spin 0, 1, 2, or 3.

An outcome is impossible if it cannot happen. It is impossible to spin 5.

An outcome is certain if it is definitely going to happen. The spinner is certain to land on a number less than 4.

This spinner has 3 outcomes: green, orange, and purple.

It is possible to land on purple, green, or orange. It is impossible to land on red.

Write whether each outcome is certain, possible, or impossible.

1. a. green  
   b. number 4
2. a. green  
   b. brown
3. a. yellow  
   b. purple
4. a. green  
   b. number 2
Dear Student,

Problem solvers are super sleuths. We invite you to become a super sleuth by using these *four* steps when solving problems.

1. **Read**
2. **Plan**
3. **Solve**
4. **Check**

Sleuths use clues to find a solution to a problem. When working together to solve a problem, you may choose to use one or more of these strategies as clues:

**Strategy File**

**Use These Strategies**
- Logical Reasoning
- Work Backward
- Interpret the Remainder
- Use a Drawing or Model
- Solve a Simpler Problem

**Strategy File**

**Use These Strategies**
- Make a Table
- Draw a Picture
- Use Simpler Numbers
- Choose the Operation
- Find a Pattern

**Strategy File**

**Use These Strategies**
- Write a Number Sentence
- Use More Than One Step
- Use a Graph
- Guess and Test
Visualize yourself in the problem.
List the facts and the questions.

As you read a problem, create a picture in your mind. Make believe you are there in the problem. This will help you think about:
- what facts you will need;
- what the problem is asking;
- how you will solve the problem.

After reading the problem, draw and label a picture of what you imagine the problem is all about.

Name or list all the facts given in the problem. Name the question or questions the problem asks.

Choose and outline a plan.

Think about how to solve the problem by:
- looking at the picture you drew;
- thinking about how you solved similar problems;
- choosing a strategy or strategies for solving the problem.

Work the plan.

Work with the listed facts and the strategy to find the solution. Sometimes a problem will require you to add, subtract, multiply, or divide. Problems with more than one step require more than one choice of operation or strategy. It is good to estimate the answer before you compute.

Test that the solution is reasonable.

Ask yourself:
- “Have you answered the question?”
- “Is the answer reasonable?”

You might want to check the answer by comparing it to an estimate. If the answer is not reasonable, check your computation.
Strategy: Guess and Test

Daryl read 16 mystery and science fiction books. He read three times as many mystery books as science fiction books. How many mystery books did he read?

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

Facts: 16 books in all
       3 times as many mystery books as science fiction

Question: How many mystery books did he read?

Make a guess. Test your guess by multiplying it by 3, then adding the product and your guess. Make a table to record your guesses.

<table>
<thead>
<tr>
<th>Science Fiction</th>
<th>Mystery</th>
<th>Total</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3 × 2 = 6</td>
<td>2 + 6 = 8</td>
<td>8 &lt; 16</td>
</tr>
<tr>
<td>3</td>
<td>3 × 3 = 9</td>
<td>3 + 9 = 12</td>
<td>9 &lt; 16</td>
</tr>
<tr>
<td>4</td>
<td>3 × 4 = 12</td>
<td>4 + 12 = 16</td>
<td>16 = 16</td>
</tr>
</tbody>
</table>

Daryl read 12 mystery books.

Does the number of mystery books read equal 3 times the number of science fiction books? Yes, because 12 = 3 × 4.

Does the total number of books equal 16? Yes, because 4 + 12 = 16.
Strategy: Use More Than One Step

Gerry has 50¢. Jay has 30¢ more than Gerry. Do they have enough money in all to buy a card for 1 dollar?

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

Facts: Gerry—50¢
      Jay—30¢ more than Gerry
      card—costs 1 dollar

Question: Do they have enough money to buy a card for 1 dollar?

Is more than one step needed to solve this problem? Yes.

Remember: one dollar = 100¢ or $1.00

To find the amount Jay has, add: $50¢ + 30¢ = ?$

To find if Gerry and Jay have enough money in all, first add the amount of money they have together. Then compare the total amount with the cost of the card.

\[
\begin{align*}
50¢ & \quad \quad \quad 50¢ \text{ Gerry's money} \\
+30¢ & \quad \quad \quad +80¢ \text{ Jay's money} \\
80¢ & \quad \quad \quad 130¢ \text{ in all}
\end{align*}
\]

Since $130¢ > 100¢$, they have enough money.

Do the problem a different way. Since Jay has more than 50¢, they have enough money.

\[
50¢ + 50¢ = 100¢ = $1.00
\]

The answer is reasonable.
Strategy: Find a Pattern

Raisa made up this number pattern. What are the missing eighth and ninth terms in her pattern?

1, 5, 4, 8, 7, 11, 10, __, __, 17, . . .

As you look at the pattern, you notice that the second number is greater than the first, the third number is less than the second, and so on.

Visualize the problem on a number line.

Facts: a number pattern of 10 terms
The numbers in the pattern increase, then decrease.

Question: What are the missing eighth and ninth terms?

Look at the numbers in the pattern.
Since the second number is greater and the third number is less, try adding first, subtracting next, and so on.

Solve

1, 5, 4, 8, 7, 11, 10
+4, -1, +4, -1, +4, -1

Use the pattern.
10 + 4 = 14 eighth term
14 - 1 = 13 ninth term

Check

Check your computations. Does 13 + 4 = 17? Yes.
Strategy: Logical Reasoning

Erin, Taylor, and Sabrina ran the 100-meter dash. Erin, wearing number 34, did not win. Taylor, wearing number 47, did not come in third. Taylor finished two seconds behind the runner wearing number 20. In what order did the three runners finish the race?

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

Facts: Erin did not win.
Taylor did not come in third.
Taylor finished 2 seconds behind the runner wearing number 20.

Question: In what order did the three runners finish the race?

Use the facts to complete the table. Write yes when the fact is true. Write no when the fact is false.

<table>
<thead>
<tr>
<th>Runner</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erin</td>
<td>no</td>
</tr>
<tr>
<td>Taylor</td>
<td>no</td>
</tr>
<tr>
<td>Sabrina</td>
<td>yes</td>
</tr>
</tbody>
</table>

Erin did not win. (Write no under 1st.)
Taylor did not finish 3rd. (Write no under 3rd.)
Since Taylor finished 2 seconds behind the runner wearing number 20, he was not 1st, but 2nd. (Write no under 1st; write yes under 2nd.)
Erin had to finish 3rd. (Write yes under 3rd.)
So Sabrina, wearing number 20, finished 1st.

Check

Compare the completed table to the facts given.
Applications: Mixed Review

Choose a strategy from the list or use another strategy you know to solve each problem.

1. There are 4 white mice in a cage. There are double that number of black mice in another cage. How many mice are there in the two cages?

2. Murph has eight pet cages. She puts 3 pets in every other cage. Two of the pets have fur. How many pets does she put into cages?

3. Kara bought 3 pets. She spent exactly $12. Which pets did she buy if a fish cost $2, a hermit crab cost $3, a mouse cost $5, and a bird cost $6?

4. Every third person who came into the store bought 4 fish. Thirteen people came into the store. How many fish were sold?

5. Nichelle collects dinosaur and sports star pogs. She has 25 pogs altogether. If Nichelle has four times as many dinosaur pogs as sport star pogs, how many dinosaur pogs does she have?

6. There are 3 pet cages along the back wall of Murph’s Pet Shop. On each of the other three sides of the shop there are 4 cages. How many pet cages are there altogether?

Strategy File

Use These Strategies
Guess and Test
Find a Pattern
Use More Than One Step
Logical Reasoning
Act It Out
In this chapter you will:
Read, write, compare, order, and round numbers
Count money and make change
Explore counting patterns and one thousand
Solve problems by drawing a picture

Critical Thinking/Finding Together
Look at the tickets at the bottom of the page. What ticket number comes before? What ticket number comes next?

NUMBERS, NUMBERS
Numbers in the grocery store
About the things we eat,
Numbers on the doorways,
And in the city street.

Numbers on the calendar,
On signs that flash or glow,
Numbers on the telephone,
Or tickets for the show.

Numbers on the buses,
On money that I spend,
Numbers on the stamps I put
On letters that I send.

Numbers on the highways, yes,
And numbers in a book!
It seems I’m seeing numbers
Almost everywhere I look!

Lee Blair
Hundreds

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

Read 235 as: two hundred thirty-five.

Study these examples.

Write the number in standard form.

Use base ten blocks to model each number. Then write the number in standard form.

5. four hundred twenty-seven
6. five hundred nineteen
7. three hundred thirty-three
8. one hundred ten
Complete. Write each in expanded form.

9. 576 \hspace{0.5cm} 5 \text{ hundreds} \hspace{0.5cm} 7 \text{ tens} \hspace{0.5cm} 6 \text{ ones} \hspace{0.5cm} 500 + 70 + 6

10. 412 \hspace{0.5cm} \_ \text{ hundreds} \hspace{0.5cm} \_ \text{ tens} \hspace{0.5cm} \_ \text{ ones} \hspace{0.5cm} \_ + \_ + \_

11. 890 \hspace{0.5cm} \_ \text{ hundreds} \hspace{0.5cm} \_ \text{ tens} \hspace{0.5cm} \_ \text{ ones} \hspace{0.5cm} \_ + \_ + \_

12. 605 \hspace{0.5cm} \_ \text{ hundreds} \hspace{0.5cm} \_ \text{ tens} \hspace{0.5cm} \_ \text{ ones} \hspace{0.5cm} \_ + \_ + \_

13. 500 \hspace{0.5cm} \_ \text{ hundreds} \hspace{0.5cm} \_ \text{ tens} \hspace{0.5cm} \_ \text{ ones} \hspace{0.5cm} \_ + \_ + \_

Write the number in standard form.

14. 300 + 50 + 2 \hspace{0.5cm} 15. 200 + 40 + 8 \hspace{0.5cm} 16. 300 + 20 + 7

17. 700 + 70 + 7 \hspace{0.5cm} 18. 500 + 60 + 3 \hspace{0.5cm} 19. 800 + 70 + 0

20. 400 + 0 + 4 \hspace{0.5cm} 21. 600 + 8 \hspace{0.5cm} 22. 200 + 10

In what place is the underlined digit? What is its value?

23. 6\_1 \hspace{0.5cm} 24. 8\_7 \hspace{0.5cm} 25. 7\_1 \hspace{0.5cm} 26. 8\_7 \hspace{0.5cm} 27. 7\_5

28. 9\_4 \hspace{0.5cm} 29. 4\_5 \hspace{0.5cm} 30. 4\_8 \hspace{0.5cm} 31. 7\_1 \hspace{0.5cm} 32. 4

33. 8\_8 \hspace{0.5cm} 34. 8\_8 \hspace{0.5cm} 35. 8\_0 \hspace{0.5cm} 36. 8\_8 \hspace{0.5cm} 37. 8\_0

Write the word name for each.

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>40.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>42.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>44.</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>41.</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>43.</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>45.</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

MENTAL MATH

46. How much greater than 362 is: 462, 562, 662, 372, 382?

47. How much less than 957 is: 857, 757, 657, 947, 937?
Compare Numbers

Who has more votes, Jim or Terri?

To find who has more, compare the numbers.

➤ Use base ten blocks to compare.
- Model each number.

<table>
<thead>
<tr>
<th>Jim</th>
<th>Terri</th>
</tr>
</thead>
<tbody>
<tr>
<td>222</td>
<td>212</td>
</tr>
</tbody>
</table>

- Look at the models to compare the digits with the greatest place value.

- Look at the models to compare the next digits.

So 222 > 212.

Jim has more votes.

➤ Use a number line to compare.

Use a number line to compare. 127 __ 136

Think

127 comes before 136.
127 is less than 136.

So 127 < 136.
Use base ten blocks or a number line to compare. Write < or >.

1. 26 _ 46
2. 35 _ 51
3. 44 _ 47
4. 90 _ 97
5. 74 _ 103
6. 318 _ 68
7. 148 _ 348
8. 719 _ 519
9. 212 _ 210
10. 384 _ 389
11. 949 _ 947
12. 333 _ 334

**Use a Place-Value Chart to Compare**

**Compare: 847 _ 779**
- Look at the digits with the greatest place value.
- There are no hundreds in 94. There is 1 hundred in 104.
- So 847 _ 779.

**Compare: 94 _ 104**
- There are no hundreds in 94. There is 1 hundred in 104.
- So 94 _ 104.

**Compare: 604 _ 610**
- Hundreds digits are the same. Look at the tens place.
- So 604 _ 610.

**Compare: 604 _ 601**
- Hundreds and tens digits are the same. Look at the ones place.
- So 604 _ 601.

**Compare. Write <, =, or >.**

13. 53 _ 50
14. 87 _ 87
15. 398 _ 389
16. 105 _ 115
17. 451 _ 541
18. 209 _ 204
19. 241 _ 89
20. 692 _ 692
21. 712 _ 72
Order Numbers

List the waterfalls from highest to lowest.

- Use a number line to order numbers.

<table>
<thead>
<tr>
<th>Three U.S. Waterfalls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Ribbon</td>
</tr>
<tr>
<td>Widow’s Tears</td>
</tr>
<tr>
<td>Upper Yosemite</td>
</tr>
</tbody>
</table>

From greatest to least, the numbers are 491, 436, and 335.
From highest to lowest, the waterfalls are Ribbon, Upper Yosemite, and Widow’s Tears.

- Use the value of the digits to order the numbers.

Write in order from least to greatest: 652, 424, 435.

- Compare hundreds.
  - 652
  - 424
  - 435

- Compare tens.
  - 600 > 400
  - 20 < 30

In order from least to greatest: 424, 435, 652.

Write in order from greatest to least: 635, 725, 88.

- Compare hundreds.
  - 635
  - 725
  - 88

Think

- 88 has no hundreds.
- 88 is the least.

In order from greatest to least: 725, 635, 88.
Write in order from greatest to least.
Use the number line.

1. 80, 40, 60  2. 70, 50, 90  3. 35, 83, 69
4. 76, 52, 38  5. 42, 61, 56  6. 75, 136, 107

Write in order from least to greatest.
10. 35, 27, 42  11. 88, 25, 63  12. 115, 92, 218
13. 157, 75, 213  14. 416, 747, 98  15. 224, 94, 386
16. 396, 385, 408  17. 566, 595, 481  18. 712, 716, 748

Problem Solving

23. Use the digits 4, 5, and 7 to write as many 3-digit numbers as you can, using each digit only once. Then write the numbers from least to greatest.

TEST PREPARATION
24. From left to right, which set of numbers is not in order from greatest to least?

A 929, 928, 820  B 725, 748, 750
C 480, 475, 465  D 700, 630, 520
Materials: 2 hundred charts, 1 red and 1 blue crayon or colored pencil

Step 1
Use one of the hundred charts.
Start at 0.
Count by 3s.
Color each count of 3 red.

Step 2
Use the second hundred chart.
Start at 0.
Count by 4s.
Color each count of 4 blue.

Step 3
Look at each hundred chart.
Who said the most numbers?

Use a different hundred chart for each exercise.
Color each number you count.

1. Count by 2s.  2. Count by 5s.  3. Count by 10s.

4. For each hundred chart made, describe the pattern formed.
Count by 3s. Write the numbers. You may use a hundred chart.

5. Start at 33. End at 48.
6. Start at 42. End at 27.
7. Start at 72. End at 60.

Count by 4s. Write the numbers. You may use a hundred chart.

10. Start at 63. End at 43.

Write the missing numbers. Explain how you count for each.

11. 28, 30, 32, ?, 36, ?, 40
12. 40, 45, ?, 55, ?, ?, 70
13. 24, 27, ?, 33, ?, ?, 42
14. 70, 80, ?, 100, ?, 120
15. 49, 45, ?, 37, ?, 29, ?, 21
16. 86, 83, 80, ?, 74, ?, ?, 65

Count to find the amount shown.

17. 
18. 

Problem Solving

19. I am an even number between 10 and 15. You say me when you count by 3s. What number am I?
20. I have no ones. I am an even number between 15 and 25. You say me when you count by 4s from 0. What number am I?
What Is One Thousand?

Materials: 10 copies of a 10 × 10 grid, pencil
10 hundred flats

1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
91, 92, 93, 94, 95, 96, 97, 98, 99, 100...
991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

One thousand, or 1000, is the next counting number after 999.

1. How is 1000 like 10 and like 100?
2. How is 1000 different from both 10 and 100?
3. What patterns do you notice?

Find out just how large 1000 is.

Draw a dot in each square on one grid.

4. How many dots do you have altogether?
5. How many groups of 10 dots do you have?

Now draw a dot in each square on four more grids.

6. How many groups of 100 dots do you have?
7. How many groups of 10 dots do you have?
8. How many dots do you have altogether?

500 is halfway to 1000.

9. How many more groups of 10 dots do you think you need to show 1000 dots?

Draw the number of dots you need on more grids to show 1000.

10. How many groups of 10 dots are there?

11. How many groups of 100 dots do you have altogether?

Now look at your hundred flats.

12. Group 5 hundred flats together. How many groups of 100 squares do you have? How many squares do you have altogether?

13. How many hundred flats do you need to make 1000 squares?

Communicate

14. How many tens is 1000 equal to?

15. How many hundreds is 1000 equal to?

Write About It

16. Work with your classmates. Cut apart the 10 grids into strips of 10 dots each. Tape the strips of dots end to end to form a banner.

Predict where in the classroom the banner of 1000 dots would end if it began at the edge of the board and extended around the room. Do you think the banner would wrap around the room? Explain. Then test your predictions.
Lisa wrote the number she modeled in different ways.

10 hundreds = 1 thousand
10 hundreds = 1000

2 thousands + 3 hundreds + 1 ten + 4 ones = 2,314

Expanded Form

Standard Form

Read 2,314 as: two thousand, three hundred fourteen.

Study these examples.

Look at the place-value chart.

Four-digit numbers may be written with or without a comma.

<table>
<thead>
<tr>
<th>thousands</th>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>Expanded Form</th>
<th>Standard Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 2 7 0</td>
<td>6,000</td>
<td>200</td>
<td>70 0</td>
<td>6,000 + 200 + 70 + 0</td>
<td>6,270</td>
</tr>
<tr>
<td>5 0 0 4</td>
<td>5,000</td>
<td>0</td>
<td>0 4</td>
<td>5,000 + 0 + 0 + 4</td>
<td>5,004</td>
</tr>
<tr>
<td>3 0 1 5</td>
<td>3,000</td>
<td>0</td>
<td>10 5</td>
<td>3,000 + 0 + 10 + 5</td>
<td>3,015</td>
</tr>
<tr>
<td>9 6 0 0</td>
<td>9,000</td>
<td>600</td>
<td>0 0</td>
<td>9,000 + 600 + 0 + 0</td>
<td>9,600</td>
</tr>
</tbody>
</table>

Write the number in standard form.

1. 
2. 
3.
Use base ten blocks to model each number. Then write the number in standard form.

4. 8 thousands 0 hundreds 5 tens 7 ones
5. 4 thousands 8 hundreds 2 tens 6 ones
6. 3 thousands 5 hundreds 0 tens 0 ones

Write the place value of the digits.

7. 6,020 = ? thousands ? hundreds ? tens ? ones

Write the number in standard form.

9. 8,000 + 400 + 20 + 6
10. 3,000 + 900 + 70 + 8
11. 7,000 + 800 + 0 + 3
12. 9,000 + 0 + 40 + 0

Write the number in both standard and expanded forms.

13. two thousand, four hundred ninety
14. one thousand, two hundred twelve
15. five thousand, fifty-six
16. three thousand, five

In what place is the underlined digit? What is its value?

17. 4,181
18. 1,111
19. 8,181
20. 1,818
21. 1,010
22. 5,115
23. 1,515
24. 5,005
25. 5,050
26. 5,555

27. Write the greatest 4-digit number.
28. Write the least 4-digit number that has no zeros.
At one summer Olympic event, there were 52,693 people. At 5 events, there were 204,372 people.

To show these numbers, extend the place-value chart.

Read 52,693 as: fifty-two thousand, six hundred ninety-three.

Read 204,372 as: two hundred four thousand, three hundred seventy-two.
Write how many thousands.

1. 40,000 = \_ thousands
2. 57,000 = \_ thousands
3. 749,000 = \_ thousands
4. 926,000 = \_ thousands

Complete. Then write each number in expanded form.

5. 82,346 \_ ten thousands \_ thousands \_ hundreds \_ tens \_ ones
6. 498,576 \_ hundred thousands \_ ten thousands \_ thousands \_ hundreds \_ tens \_ ones
7. 310,430 \_ hundred thousands \_ ten thousand \_ thousands \_ hundreds \_ tens \_ ones
8. 601,038 \_ hundred thousands \_ ten thousands \_ thousand \_ hundreds \_ tens \_ ones

Write the number in standard form.

9. 2 ten thousands
10. 7 hundred thousands
11. 20,000 + 7000 + 40 + 3
12. 600,000 + 80,000 + 4000 + 90 + 1

In what place is the underlined digit?
What is its value?

13. 47,896
14. 316,000
15. 881,720
16. 573,128

Write the number word in standard form.

17. Ninety-two thousand, seven hundred six people went to a baseball game in Los Angeles.
18. One hundred ninety-nine thousand, eight hundred fifty-four people went to a soccer match in Brazil.
Compare and Order Larger Numbers

The Sears Tower is 1450 feet tall. The Empire State Building is 1250 feet tall. Which building is taller?

Compare: 1450 ? 1250

<table>
<thead>
<tr>
<th>th</th>
<th>h</th>
<th>t</th>
<th>o</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Compare thousands. 1000 = 1000

Compare hundreds. 400 > 200
So 1450 > 1250.

The Sears Tower is taller.

To compare numbers, look at the greatest place of each number.

Compare: 275,354 ? 286,972

Compare hundred thousands. 200,000 = 200,000

Compare ten thousands. 70,000 < 80,000
So 275,353 < 286,972.

Which place is used to compare each?

1. 6000 < 8000  
2. 5200 > 3200  
3. 6380 < 6480

4. 880,900 < 999,000  
5. 6305 < 6350  
6. 34,310 < 35,870

Compare. Write <, =, or >.

7. 2176 ? 1542  
8. 13,721 ? 12,701  
9. 265,380 ? 245,290

10. 28,512 ? 28,712  
11. 5940 ? 5940  
12. 214,324 ? 24,334

13. 530 ? 5320  
14. 34,852 ? 33,859  
15. 2708 ? 2709
Order Larger Numbers

Write in order from least to greatest: 5498, 4554, 5224

- Compare thousands.
  - 5498
  - 4554
  - 5224

- Compare hundreds.
  - 5498
  - 5224
  - 400 > 200
  - 5498 > 5224

4554 is least. 5498 is greatest.

In order from least to greatest: 4554, 5224, 5498

Write in order from greatest to least: 342,735 411,815 384,689

- Compare hundred thousands.
  - 342,735
  - 411,815
  - 384,689

- Compare ten thousands.
  - 342,735
  - 384,689
  - 40,000 < 80,000
  - 342,735 < 384,689

411,815 is greatest. 342,735 is least.

In order from greatest to least: 411,815; 384,689; 342,735

Write in order from least to greatest:

16. 3510, 4510, 2510
17. 7208, 6208, 4878
18. 51,770; 51,402; 53,206
19. 273,045; 270,813; 283,419

Write in order from greatest to least:

20. 3280, 3260, 3400
21. 9721, 9716, 9761
22. 45,082; 55,197; 35,189
23. 17,217; 19,116; 18,125
24. 372,053; 390,514; 390,681
25. 821,492; 832,518; 831,677
Round Numbers

You can round numbers to tell about how many.

Round 1200, 3500, and 5810 to the nearest thousand. Use rounding rules.

Rounding Rules

- Find the place to which you want to round. Look at the digit to its right.
- If the digit is less than 5, round down. If the digit is 5 or more, round up.

To round numbers to the nearest thousand, look at the digit in the hundreds place.

1200

\[ \begin{align*}
2 &< 5 \\
\text{Round down to } &1000.
\end{align*} \]

3500

\[ \begin{align*}
5 &= 5 \\
\text{Round up to } &4000.
\end{align*} \]

5810

\[ \begin{align*}
8 &> 5 \\
\text{Round up to } &6000.
\end{align*} \]

Study these examples.

To round 467 to the nearest ten, look at the digit in the ones place.

467

\[ \begin{align*}
7 &> 5 \\
\text{Round up to } &470.
\end{align*} \]

To round 710 to the nearest hundred, look at the digit in the tens place.

710

\[ \begin{align*}
1 &< 5 \\
\text{Round down to } &700.
\end{align*} \]
Round to the nearest ten.

1. 86  2. 54  3. 68  4. 25  5. 99
   
   6. 245  7. 358  8. 171  9. 802  10. 555

Round to the nearest hundred.


Round to the nearest thousand.


26. 4037  27. 2810  28. 6682  29. 1042  30. 5505

Write About It

31. Think of how you rounded numbers to the nearest 10, 100, and 1000. Which place did you look at to round a number to the nearest 10? to the nearest 100? to the nearest 1000? Explain how you used these digits to round numbers.

32. Read the headline in the newspaper at the right. Do you think exactly 100,000 people attended the concert? Explain your reasoning. Then write about and identify situations when an exact answer is needed and those when a rounded answer is needed.

33. Write four 3-digit numbers that round to 700 when rounded to the nearest hundred.

34. Round 5782 to the nearest ten, hundred, and thousand.
Coins and Bills

one dollar
$1.00 or $1
100¢

five dollars
$5.00 or $5
500¢

ten dollars
$10.00 or $10
1000¢

Yolanda has 1 five-dollar bill, 1 one-dollar bill, 2 dimes, and 2 nickels. How much money does Yolanda have?

Count on:

$5.00
$6.00
$6.10
$6.20
$6.25
$6.30

Yolanda has $6.30.

Write the amount. Use the dollar sign ($) and decimal point (.).

1. 2.
Write the amount. Use the dollar sign ($) and decimal point (.)

3. [Image of a five-dollar bill and coins]

4. [Image of bills and coins]

5. 1 five-dollar bill, 2 nickels, 2 pennies

6. 3 one-dollar bills, 1 quarter, 3 dimes, 1 penny

7. 1 ten-dollar bill, 1 half dollar, 4 dimes

8. 1 ten-dollar bill, 2 five-dollar bills, 3 quarters

9. 3 ten-dollar bills, 2 dimes, 6 pennies

Problem Solving

10. Robert has 1 quarter and 2 dimes. He earns one dollar. How much money does Robert have now?

11. Ty has 1 five-dollar bill, 2 one-dollar bills, one dollar coin, and 9 dimes. How much money does Ty have?

12. How could you make $7.65 with the fewest bills and coins?

13. If John has $87.30, what is the greatest number of five-dollar bills he could have? ten-dollar bills?

DO YOU REMEMBER?

Complete each pattern. Write the pattern rule.

14. 5¢, 10¢, 15¢, 20¢, ___, ___

15. 1¢, 3¢, 5¢, 7¢, ___, ___

16. 25¢, 35¢, 45¢, 55¢, ___, ___

17. 25¢, 50¢, 75¢, 100¢, ___, ___

1 dollar coin = $1.00 = 100 pennies
Paula buys a book for $8.79. She gives the cashier $10.00. How much change will Paula get?

To make change, start with the cost of the item. Count up to the amount paid.

Think
Start with $8.79. Count up to $10.00.

Arrange the money in order.
Count the change:

Paula will get $1.21.

Use money to show each way.

1. Find another way Paula can get $1.21 change.
   a. use only coins
   b. use no dimes
   c. use only coins but no dimes
   d. use only nickels and pennies
Choose the correct change.

2. Robin buys a pen for $1.49. She gives the cashier $2.00.
   a. [Image of coins]  
   b. [Image of coins]

3. Bruce pays $3.19 for a notebook. He gives the cashier 3 dollars and 1 half dollar.
   a. [Image of coins]  
   b. [Image of coins]

4. Noah buys a set of markers for $4.83. He gives the cashier $5.00.
   a. [Image of coins]  
   b. [Image of coins]

Problem Solving

Tell how the cashier can make change.

5. Jane buys a ruler. She gives the cashier 3 quarters.
   - [Image of price label 69¢]

6. Morris buys a box of crayons. He gives the cashier $2.00.
   - [Image of price label $1.32]

7. Noriko buys a box of crayons. She gives the cashier 1 dollar and 2 quarters.
   - [Image of price label $3.42]

8. Cleo buys a set of paints. She gives the cashier $4.00.
   - [Image of price label $4.25]

9. Fred buys a notebook. He gives the cashier $10.00.
   - [Image of price label $4.25]
Compare and Round Money

Nan spent $6.63 on her paperback book order. Cindy spent $7.52 on her order. Who spent more money?

Use the place-value chart to compare money as you do whole numbers.

Compare: $7.52 $6.63

Look at the dollars.
$7.00 > $6.00
So $7.52 > $6.63.

Cindy spent more money than Nan.

Compare: $4.84 $4.93

Look at the dollars.
$4.00 = $4.00
The dollars are the same.
Look at the dimes.
$.80 < $.90
So $4.84 < $4.93.

Compare: $5.60 $5.62

Look at the dollars.
$5.00 = $5.00
Look at the dimes.
$.60 = $.60
Look at the pennies.
$.00 < $.02
So $5.60 < $5.62.
**Round Money Amounts**

Round $2.70, $5.50, $6.20, and $43.96 to the nearest dollar.

To round to the nearest dollar, look at the dimes.

<table>
<thead>
<tr>
<th>$2.70$</th>
<th>$5.50$</th>
<th>$6.20$</th>
<th>$43.96$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3.00$</td>
<td>$6.00$</td>
<td>$6.00$</td>
<td>$44.00$</td>
</tr>
</tbody>
</table>

Remember:
- If the digit is less than 5, round \textit{down}.
- If the digit is 5 or more, round \textit{up}.

**Round to the nearest dollar.**

7. $4.65$  
8. $3.18$  
9. $7.50$  
10. $6.75$  
11. $5.15$

12. $8.55$  
13. $2.45$  
14. $1.80$  
15. $4.50$  
16. $3.49$

17. $23.52$  
18. $45.75$  
19. $68.42$  
20. $71.65$  
21. $29.33$

**TEST PREPARATION**

22. Which statement is true?
   - A $6.04 > 6.11$
   - B $.70 < .07$
   - C $5.86 < 4.86$
   - D none of these

23. Which shows $5.49$ rounded to the nearest dollar?
   - F $5.00$
   - G $5.50$
   - H $6.00$
   - J none of these
Near the park there are 18 maple trees. Every 5th tree has been marked and is to be removed. How many trees in all will be removed?

**Read**

Visualize 18 trees in a park as you reread the problem. Focus on the facts and the question in the problem.

**Facts:**
- 18 maple trees
- remove every 5th tree

**Question:** How many trees will be removed?

**Plan**

On a separate sheet of paper draw a picture. Use dots to represent the 18 trees. Mark every 5th tree.

**Solve**

Count the number of marked trees. Three trees will be removed.

**Check**

Add the number of remaining trees and the number of trees removed.

$$\begin{align*}
15 & \quad \text{trees remaining} \\
3 & \quad \text{trees removed} \\
\hline
18 & \quad \text{total number of trees}
\end{align*}$$

Does the sum equal 18?

Yes. Your answer is correct.
Draw a picture to solve each problem.

1. Shannon had $3.27 in her piggy bank. She put 5 dimes and 9 pennies into the bank. How much money did she have in the bank then?

   **Read**
   
   Visualize yourself in the problem as you reread it. Focus on the facts and the question.

   **Facts:** She had $3.27. She put 5 dimes, 9 pennies in.

   **Question:** How much money did she have then?

   **Plan**

   Start at $3.27. Count on, beginning with the dimes.

   **Solve**

   **Check**

2. Carlos sees 12 people in line in front of him at the movies. He sees 7 people behind him. How many people are in the line?

3. The Anytown Train leaves Big City and goes 100 miles to the 1st stop, 50 miles to the next, and 5 more miles to reach Anytown. The Clayville Express leaves Big City and goes 20 miles to the 1st stop, 40 miles to the next, and 100 more miles to reach Clayville. Which city is closer to Big City by train?

4. If Di has one piece of art paper, how many cuts can she make to have just four equal strips of paper?

5. Jenny drew two straight lines in a rectangle. How many triangles did she make?
Solve and explain the method you used.

1. An aquarium ticket costs $6.00. Aileen has 5 one-dollar bills, 1 half dollar, 3 quarters, and two dimes. Can Aileen buy a ticket?

2. Six hundred eighty children from Carlton School come to the aquarium. There are 659 children from London School at the aquarium. Which school has more children at the aquarium?

3. The keeper used 200 pounds of fish food in the morning, 80 pounds in the afternoon, and 7 pounds in the evening. How many pounds of fish food did the keeper use altogether?

4. Dall porpoises weigh up to 350 pounds. Harbor porpoises weigh up to 200 pounds. Which porpoises are heavier?

5. Whales have been known to dive to depths of three thousand two hundred feet. Write this depth as a standard numeral.

Use the table for problems 6–8.

6. Which sea animals have a length of about 200 cm?

7. What whale is the shortest? the longest?

8. List the lengths of these animals from shortest to longest.

<table>
<thead>
<tr>
<th>Sea Animals</th>
<th>Length in Centimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harbor porpoise</td>
<td>180 cm</td>
</tr>
<tr>
<td>Sperm whale</td>
<td>1600 cm</td>
</tr>
<tr>
<td>Dall porpoise</td>
<td>210 cm</td>
</tr>
<tr>
<td>Blue whale</td>
<td>2400 cm</td>
</tr>
<tr>
<td>Beluga whale</td>
<td>500 cm</td>
</tr>
</tbody>
</table>
Choose a strategy from the list or use another strategy to solve each problem.

9. Josh’s library book on seals has a picture on every third page. There are 32 pages in the book. How many pictures are in the book?

10. Ted and Ana together have $1.40 in dimes. Ana has 4 fewer dimes than Ted. How much money does each have?

11. What even numbers between one thousand and two thousand have the same number of hundreds, tens, and ones?

12. Renée spent $2.25. Roberta spent 3 quarters more than Renée. How much did the two girls spend altogether?

13. There are 20 seats in the first row of the aquarium theater, 30 seats in the second row, 40 in the third row, and so on. How many seats are in the seventh row?

14. Tours of the aquarium last 1 hour. There were 140 people on the 10 o’clock tour. On each of the following tours there were 10 more people than on the one before. How many people were on the 2 o’clock tour?

15. In your Math Journal, explain why you often have to use the strategies Find a Pattern and Make a Table together. Then write a problem that requires both strategies, and have a classmate solve it.
Check Your Progress

Lessons 1–14

Write the number in standard form.  
1. 5 hundreds 4 tens 3 ones  
2. 6 hundreds 4 ones  
3. 3000 + 500 + 40 + 1  
4. 6 hundred thousands

Write the number in expanded form.  
5. six hundred ten  
6. 5025  
7. two thousand, two

Compare. Write <, =, or >.  
8. 146,980 ? 164,819  
9. 2917 ? 2719  
10. 34,023 ? 35,215

11. $3.21 ? $4.03  
12. $2.61 ? $2.59  
13. $7.59 ? $7.54

Write in order from least to greatest.  
14. 782, 698, 739  
15. 3998, 4012, 3897

Write the missing numbers.  
16. 66, 69, __, __, 78, __  
17. 74, 78, __, __, 90, __

Round to the nearest thousand or to the nearest dollar.  
18. 4023  
19. 8521  
20. 6666  
21. $6.92  
22. $2.39  
23. $5.55

Write the amount.  
24. 1 quarter, 3 nickels  
25. 5 one-dollar bills, 5 nickels, 3 pennies

Problem Solving

26. Mike buys a toy for $2.79. He gives the cashier $3.00. Name his change.

27. Kevin has 14 quarters. He puts every 4th quarter in his bank. How much money does Kevin put in his bank?
Millions

Millions are used to name very large numbers.

To show millions, extend the place-value chart.

Read 3,693,197 as:

three million, six hundred ninety-three thousand, one hundred ninety-seven

To show 3,693,197 in expanded form, write: 3,000,000 + 600,000 + 90,000 + 3000 + 100 + 90 + 7

To show three million, six hundred ninety-three thousand, one hundred ninety-seven in standard form, write: 3,693,197

Write the number in standard form.

1. 7,000,000 + 600,000
2. 4,000,000 + 30,000 + 2000
3. 5,000,000 + 200,000 + 20,000 + 4000 + 300 + 60 + 7
4. 1,000,000 + 700,000 + 90,000 + 2000 + 700 + 80 + 5

Complete the expanded form.

5. 2,080,020  ? millions  ? hundred thousands  ? ten thousands  
   ? thousands  ? hundreds  ? tens  ? ones

   ? thousands  ? hundreds  ? tens  ? ones
Chapter 1 Test

Write the number in standard form.
1. 7 hundreds 6 tens 0 ones
2. 3 hundreds 5 tens 2 ones
3. 1000 + 400 + 50 + 9
4. 8 ten thousands

Write the number in expanded form.
5. 416,805
6. 13,102
7. five thousand, forty-six

Compare. Write < or >.
8. 26 __ 62
9. $1.34 __ $1.38
10. 6330 __ 6319

Write in order from least to greatest.
11. 655, 695, 583
12. 5634, 5109, 4081

Write the missing numbers.
13. 52, 55, 58, __, __, __
14. 71, 75, 79, __, 87, __

Problem Solving

Use a strategy you have learned.
15. Sarah buys a doll for $3.99. She gives the cashier $5.00. Name her change.

Tell About It
Round to the nearest thousand or to the nearest dollar. Explain how you rounded.
16. 4535
17. $3.28

Tell About It
Find each amount. Use < and > to compare the amounts in two ways.
18. – 19.

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jay</td>
<td>1 five-dollar bill, 1 dime, 5 pennies</td>
</tr>
<tr>
<td>Drew</td>
<td>4 one-dollar bills, 2 quarters, 3 dimes</td>
</tr>
<tr>
<td>Ana</td>
<td>3 quarters, 1 half dollar, 4 one-dollar bills</td>
</tr>
</tbody>
</table>
## Test Preparation

**Choose the best answer.**

### 1. In 53,780 which digit is in the ten thousands place?
- a. 7
- b. 8
- c. 3
- d. 5

### 2. Choose the order from greatest to least.
- a. 4784, 4847, 3958
- b. 7854, 7195, 7951
- c. 9803, 8953, 8593
- d. none of the above

### 3. Choose the standard form of the number.
- a. 639
- b. 693
- c. 630
- d. 609

### 4. Choose the expanded form of the number.
- 4759
  - a. 4000 + 700 + 5 + 9
  - b. 400 + 70 + 50 + 9
  - c. 400 + 70 + 5 + 9
  - d. 4000 + 700 + 50 + 9

### 5. Choose the value of the underlined digit.
- 78,935
  - a. 7 thousand
  - b. 7 hundred
  - c. 7 ten thousands
  - d. 7 hundred thousands

### 6. What is the value of the 4 in 6458?
- a. 4
- b. 400
- c. 6400
- d. 40

### 7. Which statement is true?
- a. 758 > 785
- b. 787 > 778
- c. 709 > 719
- d. 790 > 970

### 8. What are the missing numbers?
- 21, 24, __, __, 33, __
  - a. 25, 26, 34
  - b. 26, 28, 34
  - c. 27, 29, 35
  - d. 27, 30, 36

### 9. Which statement is true?
- a. 5375 < 5573
- b. 5877 < 5778
- c. 5754 < 5547
- d. 5766 < 5677

### 10. Round to the nearest dollar.
- 
  $7.55
  - a. $7.00
  - b. $8.00
  - c. $7.50
  - d. $8.50

### 11. Round to the nearest thousand.
- 6483
  - a. 6000
  - b. 7000
  - c. 6800
  - d. 8000

### 12. Which number is less than 343?
- a. 433
- b. 344
- c. 334
- d. none of these
13. Choose the standard form of the number.
   7 hundred thousand
   a. 7000
   b. 700,000
   c. 70,000
   d. 7700

14. Choose the order from least to greatest.
   a. 7980, 7890, 7750
   b. 5780, 5879, 5889
   c. 6980, 6978, 6877
   d. 4470, 4770, 4570

15. Choose the value of the underlined digit.
   312, 690
   a. 30,000
   b. 300,000
   c. 3,000
   d. 300

16. Choose the standard form of the number.
   900 + 80 + 2
   a. 982
   b. 9820
   c. 9802
   d. 8902

17. Joan has 1 five-dollar bill, 2 one-dollar bills, 2 nickels, and 7 dimes. How much money does Joan have?
   a. $6.80
   b. $7.80
   c. $6.90
   d. $7.90

18. Choose the order from greatest to least.
   a. 298, 247, 244
   b. 478, 460, 467
   c. 877, 872, 980
   d. 688, 608, 698

19. What are the missing numbers?
   90, 85, __, 75, __, __
   a. 65, 55, 45
   b. 60, 55, 40
   c. 80, 75, 70
   d. 80, 70, 65

20. Choose the expanded form of the number.
   75,908
   a. 7,000 + 5,000 + 900 + 8
   b. 70,000 + 5,000 + 900 + 8
   c. 70,000 + 5,000 + 900 + 8
   d. 7,000 + 500 + 900 + 8

21. Choose the value of the underlined digit.
   890
   a. 8
   b. 80
   c. 800
   d. 8000

22. Margo travels 476 miles on her vacation. Nick travels 409 miles. Chris travels 469 miles. Who travels the most miles?
   a. Margo
   b. Nick
   c. Chris

23. Explain how you solved each problem. Show all your work.
   Every fourth book on a shelf needs a label. There are 48 books on the shelf. How many labels are needed?
   a. $6.80
   b. $7.80
   c. $6.90
   d. $7.90

24. Dennis buys a book that costs $5.75. He gives the cashier $10.00. Tell how the cashier can make change.
School Bus
This wide-awake freshly-painted-yellow school bus readied for Fall carries us all—Sixteen boys—Fourteen girls—Thirty pairs of sleepy eyes and hundreds upon hundreds of school supplies.

Lee Bennett Hopkins

In this chapter you will:
Explore missing addends and regrouping in addition
Estimate and add whole numbers and money
Solve problems using simpler numbers

Critical Thinking/Finding Together
Count by 2s to find how many sleepy eyes there are on the bus.
Jay and Darla added to find the distance around these figures.

They found the sum easily by using the strategies Grouping Tens and Doubles and by Counting On.

$$7 + 3 + 4 + 4 = ?$$  $$3 + 6 + 6 = ?$$

Add down.

$$\begin{array}{c}
7 \\
3 \\
4 \\
+ 4 \\
\hline
18 \\
\end{array}$$

Think...

$$7 + 3 = 10$$
$$4 + 4 = 8$$
$$10 + 8 = 18$$

Add up.

$$\begin{array}{c}
3 \\
6 \\
+ 6 \\
\hline
15 \\
\end{array}$$

Think...

$$6 + 6 = 12$$
$$12 + 3 = 15$$

The distance around equals 18 inches.

The distance around equals 15 inches.

Find the sum. Explain the strategy you use.

1. 6
   4
   +5
   =15

2. 2
   2
   +9
   =11

3. 5
   3
   +3
   =11

4. 6
   4
   +1
   =11

5. 2
   7
   +7
   =15

6. 7
   3
   +4
   =10

7. 3
1
+7
=10

8. 1
3
+8
=12

9. 2
2
+1
=5

10. 8
0
+2
=10

11. 5
2
+9
=13

12. 5

13. 2 + 8 + 5
14. 7 + 9 + 1
15. 4 + 4 + 3 + 7
16. 4 + 6 + 1 + 1
17. 5 + 5 + 0 + 3
18. 9 + 0 + 7 + 3
### Commutative Property of Addition

The Commutative Property of Addition states that changing the order of adding the addends does not change the sum.

\[
\begin{align*}
7c & \quad 10c \\
4c & \quad 1c \\
1c & \quad +3c \\
\hline
15c & \\
\end{align*}
\]

Think: 
\[10c + 4c = 14c\]

\[
\begin{align*}
3c & \quad 6c \\
12c & \quad +6c \\
\hline
15c & \quad 17c \\
\end{align*}
\]

Think: 
\[12c + 3c = 15c\]

Remember: Look for tens and doubles.

### Find the sum.

19. \[4c \quad 5c \quad 1c \quad +5c\]
20. \[2c \quad 2c \quad 5c \quad +8c\]
21. \[8c \quad 4c \quad 0c \quad +4c\]
22. \[7c \quad 4c \quad 3c \quad +4c\]
23. \[4c \quad 5c \quad 6c \quad +2c\]
24. \[5c \quad 1c \quad 8c \quad +2c\]

### Problem Solving

25. In four play-off games, Duane scored 5, 3, 5, and 2 goals. How many goals did he score in all?

26. Laverne scored 4 goals in each of three games. How many goals did she score in all?

### MENTAL MATH

### Find the answer.

27. Start with 4 → Double it → Add 2 → Add 1 → Add 6.
28. Start with 3 → Double it → Subtract 4 → Add 6 → Add 4.
29. Start with 9 → Subtract 2 → Double it → Add 4 → Subtract 1.
John wants to put 14 buttons on his backpack. He already has 8. How many more does he need?

To find how many more, find the missing addend: $8 + ? = 14$.

Use a subtraction fact to find the missing addend.

Think

$14 - 8 = ?$
$14 - 8 = 6$

So $8 + 6 = 14$. John needs 6 more buttons.

Study these examples.

<table>
<thead>
<tr>
<th>$? + 9 = 16$</th>
<th>$5 + 3 + ? = 17$</th>
<th>$17 - 8 = ?$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$16 - 9 = ?$</td>
<td>$8 + ? = 17$</td>
<td>$17 - 8 = 9$</td>
</tr>
<tr>
<td>$16 - 9 = 7$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

So $7 + 9 = 16$. So $5 + 3 + 9 = 17$.

Find the missing addend.

1. $3 + ? = 7$
2. $9 + ? = 10$
3. $2 + ? = 5$
4. $? + 4 = 9$
5. $? + 3 = 6$
6. $5 + ? = 7$
7. $12 = 4 + ?$
8. $14 = ? + 9$
9. $9 = ? + 9$
10. $11 = 9 + ?$
11. $17 = 8 + ?$
12. $12 = 7 + ?$

13. Explain how exercises 7–12 are different from exercises 1–6.
Find the missing addend.

14. 2 + ? = 8  
15. 4 + ? = 11  
16. 9 + ? = 13  
17. ? + 9 = 15  
18. ? + 3 = 12  
19. ? + 6 = 10  
20. 13 = 6 + ?  
21. 8 = ? + 7  
22. 11 = ? + 5  
23. 9 = ? + 2  
24. 10 = 3 + ?  
25. 15 = 7 + ?  
26. 18 = ? + 9  
27. 11 = ? + 3  
28. 14 = ? + 5  
29. ? + 4 + 2 = 12  
30. 6 + ? + 2 = 14  
31. 7 + 3 + ? = 20  
32. ? + 9 + 0 = 18

Problem Solving

33. Regina wants to make 12 paper dragons to decorate her room. Yesterday she made 5 dragons. How many more does Regina have to make?

34. David needs 15 coupons for a prize at the sporting goods store. He collects 4 coupons on Monday and 5 on Tuesday. How many more coupons does David need?

35. Tom needs 17 points to win the video game. He scores 3 points on his first turn and double that many points on his second turn. How many more points does Tom need?

36. Lisa wants to make 13 bracelets as gifts. She makes 5 on Friday. She decides to make 3 of them blue. How many more bracelets does Lisa need to make?

CRITICAL THINKING

Find the missing addends.

37. ? + ? + 6 = 16  
38. 10 = 2 + ? + ?  
Chapter 268

Add: No Regrouping

An estimate tells about how many or about how much.

Add: \(224 + 312 = ?\).

1. First estimate the sum using front-end estimation.
   - Add the front digits. Write 0s for the other digits.
     
     \[
     \begin{array}{c}
     224 \\
     +312 \\
     \hline
     \end{array}
     \quad \begin{array}{c}
     224 \\
     +312 \\
     \hline
     \end{array}
     
     \begin{array}{c}
     \text{about} \\
     500
     \end{array}
     
     \]

2. Then add: \(224 + 312 = ?\).
   - Add the ones. Add the tens. Add the hundreds.
     
     \[
     \begin{array}{cccc}
     \text{h} & \text{t} & \text{o} \\
     2 & 2 & 4 \\
     + & 3 & 1 & 2 \\
     \hline
     & & 6
     \end{array}
     \quad \begin{array}{cccc}
     \text{h} & \text{t} & \text{o} \\
     2 & 2 & 4 \\
     + & 3 & 1 & 2 \\
     \hline
     & & 3 & 6
     \end{array}
     \quad \begin{array}{cccc}
     \text{h} & \text{t} & \text{o} \\
     2 & 2 & 4 \\
     + & 3 & 1 & 2 \\
     \hline
     & & 5 & 3 & 6
     \end{array}
     
     \]

\(224 + 312 = 536\)

Think: 536 is close to 500.

Estimate and add money amounts the same way.

Add: \(\$4.25 + \$1.30 = ?\).

1. First estimate the sum:
   - $4.25 \rightarrow $4.00
   - $1.30 \rightarrow $1.00
   - About $5.00

2. Then add: \(\$4.25 + \$1.30 = ?\).
   - Line up the dollars and cents.
     - Add as usual.
     - Write $ and . in the sum.
     
     \[
     \begin{array}{c}
     \$4.25 \\
     + \$1.30 \\
     \hline
     \$5.55
     \end{array}
     \quad \begin{array}{c}
     4.25 \\
     + 1.30 \\
     \hline
     5.55
     \end{array}
     \quad \begin{array}{c}
     \$4.25 \\
     + \$1.30 \\
     \hline
     \$5.55
     \end{array}
     
     \]
Use front-end estimation to estimate. Then add.

1. \( \begin{array}{c} 3 \ 4 \\ + 4 \ 4 \end{array} \)
2. \( \begin{array}{c} 6 \ 5 \\ + 1 \ 1 \end{array} \)
3. \( \begin{array}{c} 2 \ 6 \\ + 5 \ 3 \end{array} \)
4. \( \begin{array}{c} 4 \ 7 \ 3 \\ + 2 \ 1 \ 6 \end{array} \)
5. \( \begin{array}{c} 8 \ 0 \ 3 \\ + 1 \ 9 \ 1 \end{array} \)

6. \( 753 + 106 \) 
7. \( 615 + 304 \) 
8. \( 8.24 + 1.73 \) 
9. \( 5.64 + 3.02 \) 
10. \( 6.56 + 1.33 \)

Find the sum.

11. \( 83 + 601 \) 
12. \( 305 + 64 \) 
13. \( 3.51 + 5.47 \)
14. \( 3.51 + 5.47 \)
15. \( 7.52 + 1.46 \) 
16. \( 17 + 31 \) 
17. \( 52 + 6 \)
18. \( 8 + 50 \) 
19. \( 20 + 617 \) 
20. \( 9.08 + 0.71 \) 
21. \( 47 + 340 \)

Align and add.

14. \( 900 + 51 \) 
15. \( 7.52 + 1.46 \) 
16. \( 17 + 31 \) 
17. \( 52 + 6 \)
18. \( 8 + 50 \) 
19. \( 20 + 617 \) 
20. \( 9.08 + 0.71 \) 
21. \( 47 + 340 \)

Add. Describe the pattern you see. To 218 add:

22. \( 10 \) 
23. \( 20 \) 
24. \( 30 \) 
25. \( 40 \) 
26. \( 50 \)
27. \( 700 \) 
28. \( 600 \) 
29. \( 500 \) 
30. \( 400 \) 
31. \( 300 \)

Find the missing addends. Guess and test.

32. \( 4 \ 2 + \square \ 7 \ 2 \) 
33. \( \square + 1 \ 5 \ 9 \ 6 \) 
34. \( 2 \ 6 + \square \ 5 \ 9 \) 
35. \( 3 \ 4 + \square \ 6 \ 8 \) 
36. \( \square + 2 \ 2 \ 9 \ 2 \)
37. \( \square + 21 = 72 \) 
38. \( \square + 47 = 69 \) 
39. \( 63 + \square = 99 \)
Mickey bought a mini bat, popcorn, and a baseball cap at the baseball game. About how much did he spend?

To find about how much, estimate the sum. You can also estimate sums by **rounding**.

Estimate: \(5.09 + 2.25 + 3.75\)

- Round each amount to the nearest dollar.
- Then add the rounded amounts.

\[
\begin{array}{ccc}
5.09 & \rightarrow & 5.00 \\
2.25 & \rightarrow & 2.00 \\
+ 3.75 & \rightarrow & + 4.00 \\
& \text{about} & $11.00 \\
\end{array}
\]

Mickey spent about $11.00.

**Study these examples.**

<table>
<thead>
<tr>
<th>Round to the nearest ten.</th>
<th>Round to the nearest ten cents.</th>
<th>Round to the nearest hundred.</th>
</tr>
</thead>
<tbody>
<tr>
<td>82 \rightarrow 80</td>
<td>$1.45 \rightarrow $1.50</td>
<td>624 \rightarrow 600</td>
</tr>
<tr>
<td>12 \rightarrow 10</td>
<td>+ .26 \rightarrow + .30</td>
<td>+ 317 \rightarrow + 300</td>
</tr>
<tr>
<td>+ 5 \rightarrow + 10</td>
<td>about $1.80</td>
<td>about 900</td>
</tr>
<tr>
<td>about 100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remember: Write the dollar sign and the decimal point.

- If the digit is less than 5, round **down**.
- If the digit is 5 or more, round **up**.
Estimate by rounding to the nearest ten or ten cents.

1. 24 2. 49 3. 72 4. $.12 5. $.14
   13 64 51 .61 .28
   +47 +31 +25 + .14 + .33

6. 92 7. 37 8. 74 9. $.47 10. $.29
   +41 +52 +83 + .19 + .29

11. 37 + 78 + 24 12. 93 + 64 + 6 13. $.05 + $.16 + $.44

Estimate by rounding to the nearest hundred or dollar.

14. 133 15. 917 16. 822 17. $1.95 18. $5.79
    +288 +245 +413 + 1.77 + 9.04

19. $1.36 20. $7.18 21. $2.49 22. $5.25 23. $6.81
    + 1.03 + 4.30 + 3.16 + 4.12 + 2.09

24. $1.17 + $1.92 25. $2.81 + $.81 26. 776 + 52

Problem Solving

Danielle has $7.00 to spend at the baseball game. Estimate. Does she have enough money to buy:

27. 1 hot dog and 1 soda?

28. 1 bag of popcorn and 1 baseball cap?

Critical Thinking

Estimate each sum using front-end estimation and then rounding.

29. 75 + 22 30. 481 + 310 31. 67 + 11 + 34

32. Will a front-end estimate be greater or less than the actual sum? Will a rounding estimate be greater than or less than the sum? Explain.
How many toy cars do Ned and Jay have in all?

First estimate the sum by rounding.

\[
\begin{array}{c}
24 \rightarrow 20 \\
+19 \rightarrow +20 \\
\quad \downarrow \\
\text{about} \quad 40
\end{array}
\]

Then to find how many toy cars in all, add: \(24 + 19 = ?\).

Ned and Jay have 43 toy cars in all.

Study these examples.

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>+2</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

10 ones = 1 ten 0 ones

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>+1</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Add the ones. Regroup.

Think
43 is close to 40. The answer is reasonable.
Add. Explain the regrouping.

1. \[\begin{array}{c}
2 & 5 \\
+ & 5 & 9 \\
\hline
\end{array}\]

2. \[\begin{array}{c}
1 & 3 \\
+ & 3 & 9 \\
\hline
\end{array}\]

3. \[\begin{array}{c}
4 & 7 \\
+ & 8 \\
\hline
\end{array}\]

4. \[\begin{array}{c}
6 & 1 \\
+ & 1 & 9 \\
\hline
\end{array}\]

5. \[\begin{array}{c}
2 & 8 \\
+ & 4 & 2 \\
\hline
\end{array}\]

Estimate by rounding. Then find the sum.

6. \[\begin{array}{c}
54 \\
+ & 26 \\
\hline
\end{array}\]

7. \[\begin{array}{c}
38 \\
+ & 29 \\
\hline
\end{array}\]

8. \[\begin{array}{c}
58 \\
+ & 31 \\
\hline
\end{array}\]

9. \[\begin{array}{c}
33 \\
+ & 29 \\
\hline
\end{array}\]

10. \[\begin{array}{c}
49 \\
+ & 24 \\
\hline
\end{array}\]

11. \[\begin{array}{c}
78 \\
+ & 18 \\
\hline
\end{array}\]

12. \[\begin{array}{c}
17 \\
+ & 58 \\
\hline
\end{array}\]

13. \[\begin{array}{c}
24 \\
+ & 66 \\
\hline
\end{array}\]

14. \[\begin{array}{c}
34 \\
+ & 49 \\
\hline
\end{array}\]

15. \[\begin{array}{c}
45 \\
+ & 19 \\
\hline
\end{array}\]

16. \[\begin{array}{c}
23 \\
+ & 37 \\
\hline
\end{array}\]

17. \[\begin{array}{c}
62 \\
+ & 24 \\
\hline
\end{array}\]

Align and add.

18. \[58 + 25\]

19. \[29 + 25\]

20. \[69 + 27\]

21. \[80 + 17\]

22. \[19 + 3\]

23. \[47¢ + 33¢\]

24. \[45¢ + 45¢\]

25. \[6¢ + 92¢\]

26. \[5¢ + 86¢\]

27. Nessa has 24 toy cars. Alvin has double the number of toy cars that Nessa has. How many toy cars do the two have altogether?

28. Jaclyn has 59 toy cars. Rosita has 35 more toy cars than Jaclyn. How many toy cars does Rosita have?

29. A chimpanzee is 34 inches tall. A gorilla is 38 inches taller than the chimpanzee. How many inches tall is the gorilla?

A 62 inches  B 64 inches  C 72 inches  D none of these
**2-6**

**Hands-On Understanding**

**Regroup Tens**

Sometimes you need to regroup tens as hundreds. \[12 \text{ tens} = ?\]

**Materials:** base ten blocks

**Step 1**

Place 1 hundred flat on your worktable.

How many tens rods stacked on top of the hundred flat equal 1 hundred?

What do you notice about 1 hundred and 10 tens?

**Step 2**

Model 12 tens.

What number does the model show?

**Step 3**

Now model the same number, 120, using fewer blocks.

What blocks did you use?

So 12 tens can be regrouped as \(?\) hundred \(?\) tens.

---

**Communicate**

1. Explain when you can regroup tens as hundreds.

Model each number using only ten rods.
Then model each number using the fewest blocks.
Describe the regrouped number.

2. 18 tens
3. 15 tens
4. 13 tens
5. 16 tens
6. 19 tens
7. 20 tens
8. 31 tens
9. 24 tens
10. 29 tens
11. 10 tens
Add: Regroup Tens

Tasha sold 56 hot dogs and 81 hamburgers. How many hot dogs and hamburgers did she sell altogether?

To find how many she sold altogether, add: $56 + 81 = ?$.

Add the ones. Regroup.

<table>
<thead>
<tr>
<th>h</th>
<th>t</th>
<th>o</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

$56 \quad 81$

$7$

Add the tens.

<table>
<thead>
<tr>
<th>h</th>
<th>t</th>
<th>o</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

$137$

Tasha sold 137 hot dogs and hamburgers.

Study these examples.

$90 + 17 = 107$

10 tens = 1 hundred 0 tens

$.34 + .74 = 1.08$

10 dimes = 1 dollar 0 dimes

Add.

1. $43 + 72$
2. $86 + 83$
3. $72 + 71$
4. $32 + 97$
5. $27 + 81$
6. $21 + 95$
7. $.64 + .72$
8. $.76 + .92$
9. $.82 + .45$
10. $.55 + .71$
11. $.91 + .63$
12. $.63 + .84$
Add: Regroup Twice

Last week April collected 58 cans for recycling. This week she collected 76 cans. How many cans did she collect in the two weeks?

- First estimate the sum by rounding.
  \[58 + 76 \rightarrow 60 + 80 = 140\]

- Then to find the number of cans, add: \(58 + 76 = ?\).

Use base ten blocks to help you add 58 and 76.

**Materials:** base ten blocks

**Step 1** Model the first addend, 58, using the fewest number of blocks.

**Step 2** Model the second addend, 76, using the fewest number of blocks.

**Step 3** Combine the ones for both addends. Regroup ones as tens. How many ones do you have?

**Step 4** Combine the tens for both addends. Regroup tens as hundreds. How many tens do you have? How many hundreds? What is the sum of 58 and 76?
Use base ten blocks to find each sum. Record your results.

1. \[65 + 99\]
2. \[49 + 97\]
3. \[56 + 44\]
4. \[38 + 83\]
5. \[99 + 86\]
6. \[15 + 95\]
7. \[16 + 99\]
8. \[28 + 77\]
9. \[43 + 88\]

Add: Use Paper and Pencil

Find the sum.

10. \[39 + 82\]
11. \[54 + 64\]
12. \[79 + 99\]
13. \[76 + 45\]
14. \[27 + 57\]
15. \[99 + 33\]
16. \[63 + 89\]
17. \[86 + 87\]
18. \[67 + 56\]
19. \[47 + 62\]
20. \[4 + 96\]
21. \[8 + 98\]

22. If you regroup twice when adding 2 two-digit numbers, how many digits would be in the sum? Explain.
This year 236 girls and 192 boys attend a school on Hill Street. How many students attend the school in all?

First estimate the sum by rounding.

\[236 + 192 \rightarrow 200 + 200 = 400\]

Then to find how many students in all, add: \[236 + 192 = \_\_\_.\]

This year 428 students attend the school.

Study this example.

First estimate by rounding. Then add.

\[\text{About } 2.63 + 4.82 = \text{ about } 8.00\]

\[1\text{ dollar } 4\text{ dimes}\]

Think

428 is close to 400. The answer is reasonable.
Estimate by rounding. Then add.

1. 264 + 127 = 391
2. 365 + 418 = 783
3. 490 + 333 = 823
4. 271 + 452 = 723
5. 609 + 156 = 765

6. $4.17 + 3.19 = $7.36
7. $2.93 + 3.86 = $6.79
8. $1.36 + 2.83 = $4.19
9. $6.25 + 1.09 = $7.34
10. $3.72 + 2.55 = $6.27

Add and check.

11. 271 + 352 = 623
12. 925 + 39 = 964
13. 192 + 42 = 234
14. 509 + 231 = 740
15. 246 + 183 = 429
16. 126 + 126 = 252
17. $4.36 + 4.93 = $9.29
18. $1.84 + 7.25 = $9.09

Align and add.

19. 677 + 151 = 828
20. 408 + 129 = 537
21. 281 + 181 = 462
22. 526 + 318 = 844
23. 776 + 52 = 828
24. 293 + 635 = 928
25. 117 + 192 = 309
26. 682 + 222 = 904
27. 24 + 866 = 890

Problem Solving

28. At lunchtime the students in grades 1–3 need 126 places in the lunchroom. The students in grades 4–6 need 281 places. If the six grades eat lunch at the same time, how many places are needed in the lunchroom?

29. Marty and his friends ordered a pizza that cost $5.75 and 2 hot dogs that cost $1.29 each. How much money did they spend?
The Lincoln Garden Club planted 568 tulips and 285 daisies in the park. How many flowers did the club plant?

First estimate the sum by rounding.

\[ 568 + 285 \rightarrow 600 + 300 = 900 \]

Then to find how many flowers the club planted, add: \( \frac{568}{285} \).

Add the ones. Regroup.

\[
\begin{array}{c|c|c}
\text{h} & \text{t} & \text{o} \\
5 & 6 & 8 \\
+ & 2 & 8 \\
\hline
& & 3 \\
\end{array}
\]

13 ones = 1 ten 3 ones

Add the tens. Regroup.

\[
\begin{array}{c|c|c}
\text{h} & \text{t} & \text{o} \\
1 & 5 & 6 \\
+ & 2 & 8 \\
\hline
& & 5 \\
\end{array}
\]

15 tens = 1 hundred 5 tens

Add the hundreds.

\[
\begin{array}{c|c|c}
\text{h} & \text{t} & \text{o} \\
1 & 1 & 5 \\
+ & 2 & 8 \\
\hline
& & 8 \\
\end{array}
\]

The Lincoln Garden Club planted 853 flowers.

Estimate by rounding. Then add.

1. \( \frac{524}{387} \)  
2. \( \frac{429}{295} \)  
3. \( \frac{324}{578} \)  
4. \$\frac{6.05}{1.97} \)  
5. \$\frac{3.29}{4.89} \)

6. \( \frac{759}{189} \)  
7. \( \frac{873}{68} \)  
8. \( \frac{427}{96} \)  
9. \$\frac{3.54}{.56} \)  
10. \$\frac{8.09}{.99} \)

11. \( \frac{495}{15} \)  
12. \( \frac{326}{83} \)  
13. \( \frac{507}{97} \)  
14. \$\frac{1.53}{.47} \)  
15. \$\frac{5.61}{.69} \)
Add and check.

16. \[ 178 + 342 \]
17. \[ 676 + 285 \]
18. \[ 382 + 317 \]
19. \[ 857 + 99 \]
20. \[ 386 + 479 \]

21. \[ 753 + 177 \]
22. \[ 429 + 245 \]
23. \[ 328 + 295 \]
24. \[ 191 + 609 \]
25. \[ 337 + 333 \]

26. \[ $2.98 + 5.18 \]
27. \[ $3.75 + 5.46 \]
28. \[ $1.24 + 7.55 \]
29. \[ $6.38 + 2.93 \]
30. \[ $1.96 + 1.06 \]

31. \[ 388 + 226 \]
32. \[ 686 + 224 \]
33. \[ 438 + 369 \]
34. \[ 884 + 47 \]
35. \[ 461 + 472 \]
36. \[ 729 + 181 \]

**Problem Solving**

37. The Lincoln Garden Club chose 165 red tulips and 158 yellow tulips to plant around the park fountain. How many tulips in all did the club plant?

38. Smithtown Garden Center sold 568 tulips to the Lincoln Garden Club and 219 tulips and 49 daisies to the Roeder Garden Club. How many tulips in all were sold to the two garden clubs?

**DO YOU REMEMBER?**

Add.

\[ 7 + 7 + 4 = \]
\[ 14 + 4 = 18 \]

39. \[ 8 + 3 + 6 \]
40. \[ 6 + 9 + 5 \]
41. \[ 7 + 8 + 9 \]

42. \[ 2 + 8 + 7 \]
43. \[ 5 + 5 + 8 \]
44. \[ 9 + 3 + 3 \]
Mental Math

You can use the properties of addition to find sums mentally.

- **Associative Property**
  Changing the *grouping* of the addends does not change the sum.

- **Commutative Property**
  Changing the *order* of the addends does not change the sum.

**Break apart numbers to find tens.**

\[
\begin{align*}
28 + 4 &= \,? \\
20 + 8 + 4 &= \,? \\
20 + 12 &= 32 \\
67 + 25 &= \,? \\
(60 + 7) + (20 + 5) &= \,? \\
(60 + 20) + (7 + 5) &= \,? \\
7 + 5 &= 10 + 2
\end{align*}
\]

Use the associative property.

\[
80 + 12 = 92
\]

**Break apart numbers to find one hundred and tens.**

\[
\begin{align*}
93 + 88 &= \,? \\
(90 + 3) + (80 + 8) &= \,? \\
(90 + 80) + (3 + 8) &= \,? \\
170 + 11 &= 181
\end{align*}
\]

**For additions with more than two addends, look for tens or one hundred.**

\[
\begin{align*}
67 + 42 + 33 &= \,? \\
67 + 33 + 42 &= \,? \\
35 + 25 + 19 &= \,? \\
35 + 25 + 19 &= \,? \\
60 + 19 &= 79
\end{align*}
\]

Use the commutative property.

\[
100 + 42 = 142
\]
Add mentally. Look for tens or one hundred.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>$19 + 9$</td>
<td>2.</td>
<td>$6 + 55$</td>
<td>3.</td>
</tr>
<tr>
<td>5.</td>
<td>$76 + 19$</td>
<td>6.</td>
<td>$89 + 11$</td>
<td>7.</td>
</tr>
<tr>
<td>9.</td>
<td>$39 + 7$</td>
<td>10.</td>
<td>$16 + 6$</td>
<td>11.</td>
</tr>
<tr>
<td>15.</td>
<td>$31 + 15$</td>
<td>16.</td>
<td>$54 + 40$</td>
<td>17.</td>
</tr>
<tr>
<td>21.</td>
<td>$64 + 22$</td>
<td>22.</td>
<td>$19 + 78$</td>
<td>23.</td>
</tr>
<tr>
<td>27.</td>
<td>$25 + 8 + 25$</td>
<td>28.</td>
<td>$36 + 14 + 49$</td>
<td>29.</td>
</tr>
<tr>
<td>30.</td>
<td>$11 + 76 + 43$</td>
<td>31.</td>
<td>$55 + 19 + 30$</td>
<td>32.</td>
</tr>
</tbody>
</table>

**Problem Solving**

36. Kate and Emma collect bottle caps. Kate has 38 caps. Emma has 57 caps. How many caps do they have in all?

37. Brendan has three dogs. The dogs weigh 29 pounds, 42 pounds, and 71 pounds each. How much do the dogs weigh in all?

**CRITICAL THINKING**

Tell whether you would solve the problem mentally or using pencil and paper. Explain. Then solve.

38. $80 + 40 + 30$
39. $18 + 44 + 97$
40. $25 + 61 + 75$
41. $52 + 12 + 36$
2-12

Regroup Hundreds as Thousands

Sometimes you need to regroup hundreds as thousands. 12 hundreds = ?

Materials: base ten blocks

Step 1
Place 1 thousand cube on your worktable.
How many hundred flats stacked on top of each other equal 1 thousand cube?
What do you notice about 1 thousand and 10 hundreds?

Step 2
Model 12 hundreds.
What number did you model?

Step 3
Now model the same number, using fewer blocks.
Which blocks did you use?
So 12 hundreds can be regrouped as ? thousand ? hundreds.

Communicate

1. Explain when you can regroup hundreds as thousands.

Model each number using only hundred flats.
Then model each using the fewest blocks.
Describe the regrouped number.

2. 19 hundreds  
3. 11 hundreds  
4. 20 hundreds
Regroup each number to have as many thousands as possible. Describe the regrouped number.

5. 39 hundreds
6. 27 hundreds
7. 44 hundreds
8. 18 hundreds
9. 52 hundreds
10. 33 hundreds

11. Maria’s class makes 35 hundred paper fish. They put 1000 on each mural. How many murals can they complete? How many fish will they have left?

12. Mr. Carlson buys toy figures that are packed 1000 to a box. He needs 42 hundred toy figures for his store. How many boxes of figures should he buy?

13. A sculptor has 86 hundred small stones. He uses 1000 stones for each sculpture he makes. How many sculptures can he make? How many stones will he have left?

14. Reggie decorates each clay sculpture with 1000 craft sticks. He has 53 hundred red sticks and 22 hundred blue sticks. How many sculptures can he decorate? How many extra sticks will Reggie have?

15. The of 318 is 300 + 10 + 8.

16. The of nine thousand seven hundred thirty-two is 9732.

17. An tells about how many.

18. You can estimate an amount by or by .
How many pounds of newspaper were collected by grades 2 through 4?

First estimate the sum by rounding.

\[ 335 + 834 + 155 \]
\[ \approx 300 + 800 + 200 = 1300 \]

Then to find how many, add:
\[ 335 + 834 + 155 = ? \]

Add the ones. Regroup.

Add the tens. Regroup.

Add the hundreds. Regroup.

1324 pounds of newspaper were collected.

1324 is close to 1300.

Estimate by rounding. Then add.

1. 382  2. 145  3. 173  4. $1.41  5. $1.17
   754  362  460  8.07  4.17
   +127  +656  +625  +3.12  +5.34

6. 284  7. 416  8. 335  9. $9.33  10. $1.82
   800  377  115  2.33  1.42
   +491  +186  +206  +1.55  +1.25
Add and check.

11. 143 12. 134 13. 325 14. $2.13 15. $1.75
   287       718       275       9.04       .48
   + 651     + 79      + 350     + 4.92     + 2.00

16. 82 17. 530 18. 415 19. $3.85 20. $4.63
   763       607       514       3.27       5.38
   + 385     + 73      + 145     + 3.58     + .07

Four Three-Digit Addends

Add: 216 + 301 + 570 + 132 = ?.

- First estimate the sum by rounding.
  200 + 300 + 600 + 100 = ?
  200 + 1000 = 1200
- Then add.
  216 + 301 + 570 + 132 = 1219

Align. Start with the ones.

Align and add.

21. 326 + 101 + 480 + 229
22. 350 + 406 + 232 + 581
23. 122 + 334 + 445 + 551
24. 177 + 201 + 418 + 352

Challenge

Identify the pattern rule. Then complete the pattern.

25. 0, 1, 3, 6, 10, 15, 21, __, __, __
26. 1, 2, 4, 8, 16, 32, 64, 128, __, __, __
27. 1000, 1300, 1900, 2200, 2800, __, __, __
2-14  Add Larger Numbers

How many canned goods were collected in all during the food drive?

Estimate the sum by rounding.  
\[5458 + 2797 \rightarrow 5000 + 3000 = 8000\]

To find how many, add: \(5458 + 2797 = \) ?.

<table>
<thead>
<tr>
<th>Week</th>
<th>Number of Cans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>5458</td>
</tr>
<tr>
<td>2nd</td>
<td>2797</td>
</tr>
</tbody>
</table>

Add the ones.  Regroup.  
Add the tens.  Regroup.  
Add the hundreds.  Regroup.  
Add the thousands.

During the food drive, 8255 canned goods were collected.

Estimate by rounding. Then add.

1. 2935  
   + 4508  
2. 4853  
   + 3649  
3. 8147  
   + 1269  
4. 1007  
   + 6397  
5. 3333  
   + 1777

Add. Use the \$ and . when needed.

6. 6551  
   + 2709  
7. 1173  
   + 5416  
8. 848  
   + 8152  
9. 2126  
   + 3929  
10. $55.55  
    + 25.55
11. 3784  
    + 5247  
12. $23.99  
    + 6.06  
13. 1647  
    + 1843  
14. $40.62  
    + 20.76  
15. 3784  
    + 5247

Think:  
8255 is close to 8000.  
The answer is reasonable.
Find the sum.

16. 5783 + 1811
17. 4623 + 899
18. 7053 + 1008
19. 4716 + 604
20. 7777 + 1223

21. $60.40 + 23.82
22. $30.86 + .90
23. $5.19 + 49.86
24. $60.81 + 20.19
25. $80.80 + 10.30

26. 6379 + 2669
27. 4056 + 4157
28. 295 + 5786
29. 6049 + 92
30. 8999 + 111

31. 2633 + 199
32. 87 + 1604
33. $4.01 + $31.95
34. 5999 + 19
35. $46.51 + $21.23
36. $61.53 + $10.87
37. $43.31 + $24.22
38. $34.52 + $18.30
39. $56.72 + $33.33
40. 66 + 6666
41. 2222 + 99
42. 1111 + 899

Problem Solving

43. The children at Oakhill School raised $31.48 at their craft fair and $46.16 at a bake sale. How much money did they raise?

44. The third graders collected 3784 labels for gym equipment in April and 4730 in May. Fourth graders collected 3562 in April and 4887 in May. Which grade collected more labels?

MENTAL MATH

Add mentally.

45. 5600 + 39
46. 5600 + 139
47. 5600 + 239
48. 5600 + 339
49. 5600 + 439

50. 4020 + 1100
51. 3020 + 1100
52. 2020 + 1100
53. 1020 + 1100
54. 920 + 1100
In a forest, 2184 seedlings were planted. The next year 1076 more seedlings were planted. How many seedlings were planted in the two years?

**Read**

Visualize yourself in the problem as you reread it. Focus on the facts and the question.

**Facts:**
- 2184 seedlings
- 1076 more seedlings

**Question:** How many seedlings were planted in two years?

**Plan**

Use simpler numbers to understand the problem better. Use 20 for 2184 and 10 for 1076. Reread the problem, using the simpler numbers.

**Think:**
If 20 seedlings were planted one year and 10 more were planted the next year, how many seedlings were planted in all? 30

How did you get your answer? Add: 20 + 10 = 30

So to find the answer to the original problem, add 2184 and 1076.

**Solve**

\[
\begin{array}{c}
2184 \\
+ 1076 \\
\hline
3260
\end{array}
\]

There were 3260 seedlings planted.

**Check**

Add up to check your answer. Is 3260 greater than 2184? Yes.
Use simpler numbers to solve each problem.

1. For Saturday’s game 2563 tickets were sold on Thursday, and 998 tickets were sold on Friday. What is the total number of tickets sold on the two days?

Visualize yourself in the problem as you reread it. Focus on the facts and the question.

Facts: Thursday 2563 tickets sold

Friday 998 tickets sold

Question: What is the total number sold?

Use simpler numbers. Reread the problem, using 20 as 2563 and 10 as 998.

Think: What do you need to do to find the total number of tickets? Add.

Now add the numbers given in the problem.

2. At Landis School 8453 students have goldfish. Another 1396 have tropical fish. How many students have fish as pets?

3. Roberta flew 425 miles to a layover in Texas. Then she flew 215 miles farther. How far did she fly in all?

4. A truck delivered 210 pounds of potatoes, 195 pounds of meat, and 230 pounds of fruit. What was the total weight of the items delivered?
Solve each problem and explain the method you used.

1. The game warden stocked the lake with 419 bass and 539 trout. How many fish were put into the lake?

2. Juanita had 175 baseball cards in her collection. She bought a dozen more. How many baseball cards does she have in her collection now?

3. On Thursday 5144 fans went to the swim meet. On Friday 4288 fans went to the track meet. What is the total number of fans who went to both meets?

4. A sports shop sold 32 red caps and 28 blue caps. Each cap costs $6.99. How many caps did the shop sell altogether?

5. The distance from Sportville to the park is double the distance from Sportville to the lake. How far is it from Sportville to the park?

6. Ed spent $19.20 at the sports shop. He spent $24.90 at the lake. About how much did Ed spend?

Use the table to solve problems 7–9.

7. Marty has $15. What three different items can she buy?

8. Carlos spent between $15 and $20. What two items did he buy?

9. Laurie bought 3 jump ropes. How much did she spend?

<table>
<thead>
<tr>
<th>★ SALE ★</th>
</tr>
</thead>
<tbody>
<tr>
<td>baseball caps $6.99</td>
</tr>
<tr>
<td>jump ropes $4.89</td>
</tr>
<tr>
<td>weights $16.99</td>
</tr>
<tr>
<td>sweat-bands $2.49</td>
</tr>
</tbody>
</table>
Choose a strategy from the list or use another strategy you know to solve each problem.

10. There are 18 sailboats at the dock. Every fourth sailboat is red. How many sailboats at the dock are not red?

11. On Monday Raul did 5 sit-ups. On Tuesday he did 10 sit-ups. Each day after, he doubled the number of sit-ups. How many sit-ups did Raul do on Friday?

12. An elephant named Ajani was born at the Indianapolis zoo. The baby elephant weighed 252 pounds. In the next eight months, Ajani gained 492 pounds. How much did Ajani weigh after eight months?

13. Thea’s soccer team scored 12 goals in the first three games. The team scored the same number of goals in each of the first two games. The team scored 3 fewer goals in the third game than in the second. How many goals were scored in each game?

14. The jersey numbers of the runners in a race form a pattern: 6, 11, 9, 14, 12, and so on. What is the number of the eighth runner?

Use the graph to solve problems 15–16.

15. Twelve girls and 9 boys in Jill’s class want to use jump ropes this morning. The same number of students in Tom’s class want to use jump ropes. Are there enough jump ropes for all the students?

16. The gym teacher is going to buy 25 more tennis balls and 15 more mats. Will she have more tennis balls or mats then?
Check Your Progress

Lessons 1–16

Find the sum.  
(See pp. 64–65.)

1. 4 + 3 + 7  
2. 5 + 5 + 7  
3. 6 + 4 + 3 + 3

Find the missing addend.  
(See pp. 66–67.)

4. 7 + ? = 15  
5. 3 + ? = 12  
6. 18 = ? + 6 + 3

Regroup.  
(See pp. 74, 84.)

7. 23 tens =  
   ? hundreds ? tens  
8. 34 tens =  
   ? hundreds ? tens

9. 29 tens =  
   ? hundreds ? tens  
10. 1 hundred 15 tens =  
    ? hundreds ? tens

11. 13 hundreds =  
    ? thousand ? hundreds  
12. 3 thousands 15 hundreds =  
    ? thousands ? hundreds

13. 15 dimes =  
    ? dollar ? dimes  
14. 4 dollars 16 dimes =  
    ? dollars ? dimes

Use rounding to estimate the sum. Then add and check.  
(See pp. 68–73, 75–81, 86–89.)

15. 37  
    +16  

16. 49  
    +13  

17. 73  
    +27  

18. 28  
    +31  

19. $ .65  
    + .89

20. 185  
    +136  

21. $2.27  
    + 6.84  

22. $7.34  
    + 2.95  

23. 214  
    + 331  

24. 256  
    + 572  

25. $3.49  
    + 8.73  

26. $7.19  
    + 3.29  

27. $8.93  
    + 1.37  

28. 2563  
    + 6374  

29. 4375  
    + 2856

Problem Solving  
(See pp. 90–93.)

30. Linh had 1048 stickers in one pile and 2161 in another pile. How many stickers were there altogether?
Coin Combinations

Tom has $4.00 to buy a football for $3.75.

Problem Solving  Use the table.

1. Name 5 other ways Tom can receive 25¢ in change.

2. Which way uses the least number of coins?

3. Which way uses the greatest number of coins?

Name two other ways to show each amount.

4.

5.

6. What is the least number of coins that shows 35¢?

7. What is the least number of coins that shows 65¢?

8. Jan has 18¢. She has 6 coins. Name the coins.

9. Fran has 96¢. She has 6 coins. Name two possible coin combinations.
Chapter 2 Test

Find the sum.

1. \(3¢ + 2¢ + 7¢ + 5¢\)
2. \(1¢ + 5¢ + 6¢ + 5¢\)
3. \(6 + 2 + 1 + 2\)
4. \(8 + 2 + 8 + 1\)

Find the missing addend.

5. \(9 + \square = 15\)
6. \(6 + \square + 2 = 13\)
7. \(17 = \square + 8\)
8. \(5 + \square + 3 = 16\)
9. \(\square + 5 + 5 = 15\)

Add and check.

10. \(63 \quad + 17\)
11. \(19¢ \quad + 27¢\)
12. \$.68 \quad + .48\)
13. \(249 \quad + 173\)
14. \$8.32 \quad + .42\)
15. \(650 \quad + 542\)
16. \(361 \quad + 27\)
17. \$7.84 \quad + 3.28\)
18. \(1469 \quad + 376\)
19. \(3526 \quad + 724\)

Use rounding to estimate the sum.

20. \(39 \quad + 23\)
21. \(559 \quad + 361\)
22. \$9.05 \quad + 2.75\)
23. \$74.80 \quad + 8.62\)
24. \(5328 \quad + 1009\)

Problem Solving

Use a strategy you have learned.

25. There are 327 toys on one shelf and 276 on a second shelf. How many toys are there in all?

Tell About It

Predict which exercise involves two regroupings. Explain the regrouping.

26. a. \(6253 + 476\)   b. \(4326 + 946\)

Performance Assessment

27. Write two 4-digit numbers that require two regroupings to add. Then find the sum.

\[
\square + \square \quad \square + \square
\]
Test Preparation

Choose the best answer.

1. Round to the nearest thousand.
   4509
   a. 4500
   b. 4000
   c. 5500
   d. 5000

2. $8 + 2 + 3 + 1 = ?$
   a. 13
   b. 12
   c. 14
   d. 15

3. $125 + 254 + 520$
   a. 989
   b. 899
   c. 789
   d. 799

4. Choose the value of the underlined digit.
   $19624$
   a. 1 hundred
   b. 1 thousand
   c. 1 ten thousand
   d. 1 hundred thousand

5. Round to the nearest dollar.
   $6.59$
   a. $6.50$
   b. $6.00$
   c. $7.50$
   d. $7.00$

6. In 357,812 which digit is in the hundred thousands place?
   a. 7
   b. 8
   c. 3
   d. 5

7. Choose the standard form of the number.
   two hundred ninety
   a. 290
   b. 209
   c. 299
   d. 2090

8. Find the missing addend.
   $15 = ? + 8$
   a. 9
   b. 7
   c. 6
   d. 8

9. Choose the expanded form of the number.
   $7958$
   a. $7000 + 900 + 5 + 8$
   b. $700 + 90 + 50 + 8$
   c. $7000 + 90 + 5 + 8$
   d. $7000 + 900 + 50 + 8$

10. What are the missing numbers?
    33, _, 39, 42, _, _,
    a. 36, 45, 48
    b. 35, 45, 55
    c. 34, 35, 36
    d. 32, 41, 40

11. Which statement is true?
    a. 509 > 590
    b. 377 > 397
    c. 432 > 423
    d. 245 > 249

12. In 980,617 which digit is in the thousands place?
    a. 0
    b. 6
    c. 8
    d. 9

Chapter 2 97
13.  
\[ 346 + 279 \]
\[ \text{a.} \ 525 \]
\[ \text{b.} \ 615 \]
\[ \text{c.} \ 625 \]
\[ \text{d.} \ 515 \]

14. Choose the standard form of the number.

9 hundred thousand  
\[ \text{a.} \ 9000 \]
\[ \text{b.} \ 90,000 \]
\[ \text{c.} \ 900,000 \]
\[ \text{d.} \ 990,000 \]

15. Choose the order from greatest to least.

\[ 732 + 165 \]
\[ \text{a.} \ 897 \]
\[ \text{b.} \ 997 \]
\[ \text{c.} \ 887 \]
\[ \text{d.} \ 987 \]

16. Choose the standard form of the number.

\[ 800,000 + 90,000 + 300 + 40 + 5 \]
\[ \text{a.} \ 890,345 \]
\[ \text{b.} \ 89,345 \]
\[ \text{c.} \ 809,345 \]
\[ \text{d.} \ 89,405 \]

17. There were 256 students at the school play on Friday night. Double that number came on Saturday night. How many students came to the play on both nights?

\[ \text{a.} \ 502 \]
\[ \text{b.} \ 512 \]
\[ \text{c.} \ 668 \]
\[ \text{d.} \ 768 \]

18. Estimate by rounding.

\[ 3781 + 2566 \]
\[ \text{a.} \ 5000 \]
\[ \text{b.} \ 6000 \]
\[ \text{c.} \ 7000 \]
\[ \text{d.} \ 8000 \]

19. Choose the value of the underlined digit.

\[ 682,319 \]
\[ \text{a.} \ 30 \]
\[ \text{b.} \ 300 \]
\[ \text{c.} \ 3000 \]
\[ \text{d.} \ 30,000 \]

20. Choose the standard form of the number.

\[ 40, ? , 32, 28, ?, ? \]

21. What are the missing numbers?

\[ 40, 24, 20 \]
\[ \text{a.} \ 36, 24, 20 \]
\[ \text{b.} \ 42, 26, 24 \]
\[ \text{c.} \ 39, 25, 21 \]

22. Mary has 1 five-dollar bill, 1 quarter, 3 dimes, and 5 nickels. How much money does Mary have?

\[ \text{a.} \$5.70 \]
\[ \text{b.} \$5.80 \]
\[ \text{c.} \$9.70 \]
\[ \text{d.} \$9.80 \]

23. Tom buys snacks that cost $7.50. He gives the cashier $10.00. Tell how the cashier can make change.

24. Which odd numbers between 2000 and 3000 have the same number of hundreds, tens, and ones?
In this chapter you will:
Explore regrouping in subtraction
Learn the four meanings of subtraction
Estimate and subtract whole numbers and money
Solve problems by choosing the operation

Critical Thinking/Finding Together
Write a poem using your full name, following the pattern in “The Eraser Poem.” Is your poem shorter or longer than “The Eraser Poem”? By how many lines?

THE ERASER POEM
The eraser poem.
The eraser poem
The eraser poe
The eraser po
The eraser p
The eraser
The erase
The eras
The era
The er
The e
The
Th
T

Louis Phillips
Here are four meanings of subtraction.

**Take Away**

Anita had 26 baseball caps. She sold 13 of them. How many caps are left?

\[ 26 - 13 = 13 \]

Thirteen caps are left.

**Find Part of a Whole Set**

A sporting goods store has 37 football helmets. Fifteen have stripes. How many do not have stripes?

\[ 37 - 15 = 22 \]

Twenty-two helmets have no stripes.

**Compare**

Maria has 48 football cards. Pablo has 32. How many more football cards does Maria have than Pablo?

\[ 48 - 32 = 16 \]

Maria has 16 more football cards than Pablo.

**Find How Many More Are Needed**

Lara has 13 dollars. She needs 18 dollars for a baseball pennant. How many more dollars does she need?

\[ $18 - $13 = $5 \]

Lara needs $5 more.
Solve. Tell which meaning of subtraction is shown.

1. Juan has 75 baseball cards from Team A and 72 baseball cards from Team B. How many more cards from Team A than from Team B does he have?

2. Lori kicked the ball 28 yards. Mona kicked the ball 16 yards. How many fewer yards did Mona kick the ball than Lori?

3. A baseball team had 12 bats. Two of the bats were broken in a game. How many baseball bats were left?

4. Hank had 57 toy cars. He gave 7 cars to his brother. How many toy cars does Hank have now?

5. There are 18 players on a football team. Nine of them are in the locker room. The rest are on the field at practice. How many players are on the field?

6. The library got 89 new books. Eighteen of them were science books. How many were other kinds of books?

7. The football team has 22 yards to go to the goal line. They gain 20 yards. How many more yards does the team need to make a touchdown?

8. Marco has thirty-two dollars. He needs 45 dollars to buy a baseball glove. How many more dollars does he need?

9. Peggy is 54 years old. Fred is 51 years old. How much younger is Fred than Peggy?

10. A video store sold 66 videotapes. Twenty of them were about sports. How many videotapes sold were not about sports?

Write a subtraction story for each meaning of subtraction. You may use the table.

11. Take Away

12. Find Part of a Whole Set

13. Compare

14. Find How Many More Are Needed

<table>
<thead>
<tr>
<th>Team</th>
<th>Number of Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>🏆🏆🏆</td>
</tr>
<tr>
<td>B</td>
<td>🏆🏆</td>
</tr>
<tr>
<td>C</td>
<td>🏆</td>
</tr>
<tr>
<td>D</td>
<td>🏆🏆🏆🏆🏆</td>
</tr>
</tbody>
</table>
3-2
Subtract: No Regrouping

Subtract: 279 – 157 = ?

First estimate the difference. Use front-end estimation.

Subtract the front digits. Write 0s for the other digits.

\[
\begin{array}{c}
279 \\
- 157 \\
\hline
1 \\
\end{array}
\]

Then, subtract: 279 – 157 = ?

Subtract the ones. Subtract the tens. Subtract the hundreds.

\[
\begin{array}{ccc}
\text{h} & \text{t} & \text{o} \\
2 & 7 & 9 \\
- & 1 & 5 \\
\hline
1 & 2 & 2 \\
\end{array}
\]

Estimate and subtract money amounts the same way you do whole numbers.

Subtract: $4.84 – $2.61 = ?

First estimate the difference. Use front-end estimation.

\[
\begin{array}{c}
$4.84 \\
- 2.61 \\
\hline
2.23 \\
\end{array}
\]

Then subtract: $4.84 – $2.61 = ?
Use front-end digits to estimate. Then find the difference.

1. \[424 - 412\]  
2. \[475 - 304\]  
3. \[296 - 240\]  
4. \[263 - 42\]  
5. \[917 - 12\]

6. \[257 - 43\]  
7. \[999 - 909\]  
8. \[551 - 51\]  
9. \[675 - 55\]  
10. \[988 - 83\]

11. \[54¢ - 33¢\]  
12. \[76¢ - 25¢\]  
13. \[\$3.69 - 1.37\]  
14. \[\$9.95 - 7.64\]  
15. \[\$5.06 - 2.05\]

16. \[.16 - .12\]  
17. \[.86 - .41\]  
18. \[\$6.55 - 4.50\]  
19. \[\$7.47 - 6.35\]  
20. \[\$6.78 - 4.32\]

21. \[217 - 12\]  
22. \[476 - 35\]  
23. \[869 - 59\]

Align and subtract.

24. \[728 - 405\]  
25. \[.85 - .61\]  
26. \[498 - 35\]  
27. \[6.75 - 3.62\]

28. \[.97 - .55\]  
29. \[863 - 809\]  
30. \[678 - 123\]  
31. \[566 - 45\]

Subtract. Describe the pattern you see. From 799, subtract:

32. 10  
33. 20  
34. 30  
35. 40  
36. 50

37. 100  
38. 200  
39. 300  
40. 400  
41. 500

Problem Solving

42. One dollar was collected from every child that took part in the Good Cause Marathon. If 579 boys and 345 girls took part, how much more money was collected from boys than from girls? What was the total amount collected?

43. Ellen’s class baked 755 muffins for the school bake sale. In the morning, 370 were sold. In the afternoon, 262 were sold. How many muffins were left at the end of the day?
Ice skates are on sale for $76.45. Julie has saved $64.90. About how much more does she need to buy the skates on sale?

Remember: An estimate tells *about* how much or *about* how many.

You can also estimate differences by rounding.

Estimate: $76.45 − $64.90

- Round the amounts to the nearest dollar. $76.45 → $76.00
- Then subtract the rounded amounts. $76.00 − 64.90 → $11.00
- Write the dollar sign and the decimal point.

Julie needs about $11.00 more.

Study these examples.

<table>
<thead>
<tr>
<th>Round to the nearest ten.</th>
<th>Round to the nearest ten cents.</th>
<th>Round to the nearest hundred.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 → 60</td>
<td>$1.57 → $1.60</td>
<td>859 → 900</td>
</tr>
<tr>
<td>−28 → −30</td>
<td>−.39 → −.40</td>
<td>−623 → −600</td>
</tr>
<tr>
<td>about 30</td>
<td>about $1.20</td>
<td>about 300</td>
</tr>
</tbody>
</table>

Remember: Write the dollar sign and the decimal point when subtracting money amounts.
Estimate by rounding to the nearest ten or ten cents.

1. $46 - 24 = 20$
2. $53 - 41 = 10$
3. $85 - 16 = 70$
4. $17 - .12 = 10$
5. $.37 - .22 = 10$
6. $35 - 13 = 20$
7. $77 - 36 = 40$
8. $.94 - .43 = 50$
9. $.74 - .36 = 40$
10. $.88 - .29 = 60$

Estimate by rounding to the nearest hundred or dollar.

11. $61 - 34 = 30$
12. $58 - 23 = 30$
13. $.38 - $.29 = 10$
14. $.92 - $.75 = 10$
15. $1.49 - .26 = 10$
16. $2.76 - .15 = 20$
17. $674 - 211 = 400$
18. $883 - 502 = 400$
19. $949 - 631 = 300$
20. $6.79 - 5.51 = 20$
21. $34.29 - 11.09 = 20$
22. $794 - 364 = 400$
23. $888 - 444 = 400$
24. $574 - 262 = 300$
25. $9.95 - 7.61 = 20$
26. $86.43 - 25.02 = 60$
27. $893 - 763 = 100$
28. $66.82 - 54.21 = 20$
29. $28.16 - 13.05 = 20$

Problem Solving

30. Andrew has $25 to buy world map games. About how much does he spend if the cashier gives him $3.96 as change?
31. Joan has $18 to buy a gift. About how much does she spend if the cashier gives her $2.72 as change?

TEST PREPARATION

32. Miguel had about $7 to spend. He bought a book that costs $2.40. About how much money does Miguel have left?
   A about $3   B about $5   C about $8   D about $9
How many more points does Jeff need to reach 35 points?

First estimate the difference by rounding.

\[
\begin{align*}
35 & \quad 40 \\
-18 & \quad -20 \\
\underline{\text{about}} & \quad 20
\end{align*}
\]

Then to find how many more points, subtract: \(35 - 18 = \) ?.

More ones needed. Regroup tens.

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
<th>tens</th>
<th>ones</th>
<th>tens</th>
<th>ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
<td>2</td>
<td>15</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

3 tens 5 ones = 2 tens 15 ones

Jeff needs 17 more points.

Study these examples.

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
<th>dimes</th>
<th>pennies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

3 tens 0 ones = 2 tens 10 ones

9 dimes 2 pennies = 8 dimes 12 pennies
Subtract. Use base ten blocks to help.

1. \[ \begin{array}{c}
5 & 4 \\
3 & 5 \\
\hline
\end{array} \]

2. \[ \begin{array}{c}
3 & 3 \\
1 & 9 \\
\hline
\end{array} \]

3. \[ \begin{array}{c}
2 & 0 \\
1 & 2 \\
\hline
\end{array} \]

4. \[ \begin{array}{c}
4 & 7 \\
2 & 8 \\
\hline
1 & 9 \\
\end{array} \]

Estimate by rounding. Then find the difference.

6. \[ 54 - 27 = 27 \]

7. \[ 38 - 29 = 9 \]

8. \[ 57 - 31 = 26 \]

9. \[ 44 - 29 = 15 \]

10. \[ 73 - 18 = 55 \]

11. \[ 61 - 43 = 18 \]

12. \[ 24 - 16 = 8 \]

13. \[ 82 - 65 = 17 \]

14. \[ 76 - 48 = 28 \]

15. \[ 51 - 33 = 18 \]

16. \[ 46 - 17 = 29 \]

17. \[ 62 - 54 = 8 \]

Align and subtract.

18. \[ 55 - 28 = 27 \]

19. \[ 42 - 35 = 7 \]

20. \[ 94 - 5 = 89 \]

21. \[ 81\text{c} - 17\text{c} = 64\text{c} \]

22. \[ 67\text{c} - 29\text{c} = 38\text{c} \]

23. \[ 25\text{c} - 19\text{c} = 6\text{c} \]

24. \[ 43\text{c} - 37\text{c} = 6\text{c} \]

25. \[ 92\text{c} - 6\text{c} = 86\text{c} \]

26. \[ .76 - .28 = .48 \]

27. \[ .52 - .28 = .24 \]

28. \[ .36 - .09 = .27 \]

29. \[ .84 - .55 = .29 \]

30. Show and explain in your Math Journal the steps that you would use to subtract 8 from 97. Explain why it is important to align the digits.

CRITICAL THINKING

31. Compare your estimates from exercises 6–17 with the exact differences. What do you notice?

32. How does estimating help you determine if an exact answer is reasonable?
Regroup Hundreds and Dollars

You can regroup hundreds as tens and dollars as dimes.

3 hundreds 2 tens = ？
3 dollars 4 dimes = ？

Materials: base ten blocks, play money

Step 1
Model 320, using the fewest blocks.
How did you model 320?

Step 2
Now model the same number. This time regroup one of the hundreds as tens.
How many hundreds do you have?
How many tens do you have?
So 3 hundreds 2 tens can be regrouped as ？ hundreds ？ tens.

Model each number using the fewest blocks. Then model each number regrouping one of the hundreds as tens. Describe the regrouped number.

1. 680 2. 450 3. 700 4. 990 5. 440

You can also regroup money.

Step 1
Model $3.40 using dollars and dimes only.
How did you model $3.40?
Now model the same amount. This time regroup 1 dollar as dimes.

How many dollars do you have?

How many dimes do you have?

So 3 dollars 4 dimes can be regrouped as _____ dollars _____ dimes.

11. 7 hundreds 7 tens = _____ hundreds _____ tens

12. 5 hundreds 1 ten = _____ hundreds _____ tens

13. 2 hundreds 8 tens = _____ hundred _____ tens

14. 3 hundreds 0 tens = _____ hundreds _____ tens

15. 4 dollars 1 dime = _____ dollars _____ dimes

16. 6 dollars 0 dimes = _____ dollars _____ dimes

17. Explain what happens to the hundreds and the tens when you regroup 1 hundred as tens.

18. Explain what happens to the dollars and the dimes when you regroup 1 dollar as dimes.

19. How is regrouping whole numbers the same as regrouping money?
Regroup Once in Subtraction

An express monorail can seat 326 passengers. A local monorail holds 145. How many more people can ride the express than the local?

First estimate by rounding: 300 − 100 = 200

Then to find how many more people, subtract: 326 − 145 = ?.

\[
\begin{array}{ccc}
\text{h} & \text{t} & \text{o} \\
3 & 2 & 6 \\
- & 1 & 4 \\
\hline
1 & 8 & 1 \\
\end{array}
\]

3 hundreds 2 tens = 2 hundreds 12 tens

Think

181 is close to the estimate of 200.

181 more people can ride the express monorail.

Study this example.

\[
\begin{array}{ccc}
\text{h} & \text{t} & \text{o} \\
6 & 1 & 5 \\
- & 2 & 8 \\
\hline
4 & 7 & 4 \\
\end{array}
\]

\[
\begin{array}{ccc}
\text{h} & \text{t} & \text{o} \\
6 & 1 & 5 \\
- & 2 & 8 \\
\hline
4 & 7 & 4 \\
\end{array}
\]

Line up the dollars and cents.
Subtract as usual.
Write $ and . in the difference.

Complete each subtraction. Regroup when necessary.

1. 329
  \[
  \begin{array}{ccc}
  \text{h} & \text{t} & \text{o} \\
  3 & 2 & 9 \\
  - & 1 & 6 \\
  \hline
  2 & 3 & 4 \\
  \end{array}
  \]

2. 647
  \[
  \begin{array}{ccc}
  \text{h} & \text{t} & \text{o} \\
  6 & 4 & 7 \\
  - & 1 & 8 \\
  \hline
  5 & 6 & 9 \\
  \end{array}
  \]

3. 270
  \[
  \begin{array}{ccc}
  \text{h} & \text{t} & \text{o} \\
  2 & 7 & 0 \\
  - & 1 & 3 \\
  \hline
  1 & 4 & 7 \\
  \end{array}
  \]

4. 658
  \[
  \begin{array}{ccc}
  \text{h} & \text{t} & \text{o} \\
  6 & 5 & 8 \\
  - & 9 & 7 \\
  \hline
  6 & 8 & 1 \\
  \end{array}
  \]

5. 786
  \[
  \begin{array}{ccc}
  \text{h} & \text{t} & \text{o} \\
  7 & 8 & 6 \\
  - & 3 & 2 \\
  \hline
  4 & 6 & 4 \\
  \end{array}
  \]
Estimate by rounding. Then subtract.

6. 446 - 256
7. 555 - 473
8. 839 - 449
9. 214 - 122
10. 920 - 709
11. 692 - 288
12. 186 - 78
13. 139 - 69
14. 319 - 175
15. 659 - 289
16. $6.78 - 4.84$
17. $3.12 - 1.61$
18. $2.90 - 1.25$
19. $7.74 - 0.26$
20. $9.12 - 0.07$

Align and subtract.

21. 379 - 188
22. 869 - 697
23. 555 - 464
24. 879 - 293
25. 519 - 276
26. 724 - 161
27. 757 - 682
28. 119 - 65
29. 916 - 75
30. $6.38 - 2.45$
31. $4.63 - 1.80$
32. $9.56 - 7.94$
33. $4.36 - 0.54$
34. $6.17 - 0.26$
35. $5.11 - 0.40$

Problem Solving

36. Mr. Neugent paid $4.29 to have a suit dry-cleaned and $1.35 to have a shirt cleaned. What is the difference in the two prices?

37. In one week 246 shirts and 163 suits were laundered. How many more shirts than suits were laundered?

Challenge Algebra

Complete each number sentence.

Use 565, 371, 253, and 166. Which two numbers have a difference of:

38. $118 = \_\_ - \_\_$
39. $194 = \_\_ - \_\_$
40. $205 = \_\_ - \_\_$
41. $312 = \_\_ - \_\_$
Regroup Twice in Subtraction

Of 523 people traveling to Europe, 376 went by boat. How many people went by plane?

First estimate by rounding: $500 - 400 = 100$

Then to find how many went by plane, subtract: $523 - 376 = ?$

More ones needed. Regroup tens. Subtract the ones.

More tens needed. Regroup hundreds. Subtract the tens.

More hundreds. Subtract the hundreds.

To check subtraction, add the number that was subtracted to the difference.

Exactly 147 people went by plane.

Study this example.

Line up the dollars and cents.
Subtract as usual.
Write $\$\$ and . in the difference.

$8.53 - 2.65 = ?$

$8.53$
$- 2.65$
$5.88$

$\$8.5\underline{3}$
$- 2.6\underline{5}$
$\$5.8\underline{8}$

147

+ 376

523

It checks!
Estimate by rounding. Then subtract and check.

1. \(587 - 468\)  
2. \(523 - 237\)  
3. \(781 - 372\)  
4. \(324 - 165\)  
5. \(865 - 169\)  
6. \(317 - 99\)  
7. \(260 - 75\)  
8. \(198 - 99\)  
9. \(636 - 78\)  
10. \(743 - 86\)  
11. \(5.36 - 1.87\)  
12. \(4.73 - 2.94\)  
13. \(6.60 - 3.51\)  
14. \(7.15 - 2.36\)  
15. \(4.57 - 3.58\)  

Align, subtract, and check.

16. \(747 - 179\)  
17. \(643 - 335\)  
18. \(991 - 872\)  
19. \(562 - 98\)  
20. \(154 - 68\)  
21. \(240 - 76\)  
22. \(5.65 - 1.27\)  
23. \(9.36 - 2.49\)  
24. \(6.94 - 2.27\)  
25. \(1.16 - .18\)  
26. \(2.23 - 1.78\)  
27. \(3.10 - .84\)  

28. Jenna is flying from the United States to Mexico. The airplane has traveled 315 miles. The entire trip is 825 miles. How many more miles does she have to fly?

29. Jenna bought two Mexican souvenirs. One cost $3.90. The other cost $4.99. Jenna had $9.75 in her wallet. How much money did she have left?

Mental Math
Subtract $.99 from each. Think: Subtract $1.00; add $.01.

30. \$4.25  
31. \$7.48  
32. \$5.31  
33. \$1.64
Mill workers made 400 flags daily. Of these, 276 were American flags. How many were not American flags?

- First estimate by rounding: $400 - 300 = 100$
- Then to find how many were not American flags, subtract: $400 - 276 = \_\_\_\_\_$.  

You can use base ten blocks to help subtract 276 from 400.

**Materials:** base ten blocks

**Step 1**
Model 400, using the fewest blocks.

**Step 2**
Subtract. Start with the ones.
Do you have enough ones to take away 6 ones units?
Do you have enough tens to regroup 1 ten as ones?
How can you make more tens to regroup tens as ones?
Do you have enough hundreds to regroup 1 hundred as tens?

**Step 3**
Regroup 1 hundred as tens.
How many hundreds do you have now?
How many tens do you have?
Step 4
Regroup 1 ten as ones.
How many tens do you have now?
How many ones do you have?
Can you take away 6 ones now?

Step 5
Take away 6 ones units.

Step 6
Take away 7 ten rods.

Step 7
Take away 2 hundred flats.
How many hundreds, tens, and ones do you have left?

There were 124 flags that were not American.

Estimate by rounding. Then subtract.
Use your base ten blocks to help.

1. 600
   -246
2. 500
   -192
3. 300
   -191
4. 400
   -385
5. 700
   -413

6. $2.00
   -1.42
7. $9.00
   -1.36
8. 300
   -27
9. 600
   -59
10. 200
   -89

11. Explain why you sometimes need to regroup twice in the tens place when you subtract.

DO YOU REMEMBER?
Align and add.

12. 586 + 293
13. 841 + 75
14. $7.94 + $1.62

Think...
124 is close to 100. The answer is reasonable.
3-9 Hands-On Understanding

Regroup Thousands as Hundreds

Sometimes it is necessary to regroup thousands as hundreds.

1 thousand 2 hundreds = ?

Materials: base ten blocks

Step 1

Model 1200 using the fewest blocks.

How did you model 1200?

Step 2

Now model the same number regrouping one thousand as hundreds.

How many thousands do you have?

How many hundreds do you have?

So 1 thousand 2 hundreds can be regrouped as __ thousands __ hundreds.

How many more hundreds do you have in this model than in the model for 1200 with fewer blocks? Why?

Model each number using the fewest blocks. Then model each number regrouping one of the thousands as hundreds. Describe the regrouped number.

1. 8200  2. 2300  3. 5800  4. 1400  5. 4000

6. How is regrouping thousands as hundreds the same as regrouping hundreds as thousands? How is it different?
Regroup 1 thousand as 10 hundreds. Write how many thousands and hundreds.

7. 1 thousand 2 hundreds
8. 3 thousands 8 hundreds
9. 9 thousands
10. 6 thousands 7 hundreds
11. 5 thousands 5 hundreds
12. 1 thousand
13. 7300
14. 9100
15. 2900
16. 6600
17. 4500
18. 8000
19. 3600
20. 7100
21. 8700
22. 6900

Problem Solving

23. After you regroup 1 thousand in a number, you have 7 thousands 16 hundreds. How many thousands and hundreds did you start with?

24. After you regroup 1 thousand in a number, you have 3 thousands 14 hundreds. How many thousands and hundreds did you start with?

25. After you regroup 1 thousand in a number, you have 2 thousands 15 hundreds. How many thousands and hundreds did you start with?

26. After you regroup 1 thousand in a number, you have 18 hundreds. How many thousands and hundreds did you start with?

27. After you regroup 1 thousand in a number, you have 5 thousands 12 hundreds. How many thousands and hundreds did you start with?

28. After you regroup 1 thousand in a number, you have 6 thousands 17 hundreds. How many thousands and hundreds did you start with?

TEST PREPARATION

29. A shop is selling a coat for $84.99. Shannon has $71.32. What is the closest estimate of how much more Shannon needs to buy the coat?

A less than $13  B $13  C $14  D more than $14
In Johnstown there are 9010 people. If 6789 are adults, how many are children?

First estimate by rounding:

\[ 9010 - 6789 \rightarrow 9000 - 7000 = 2000. \]

Then to find how many are children, subtract: \[ 9010 - 6789 = \_? \_ \].

There are 2221 children in Johnstown.

Estimate by rounding. Then subtract.

1. \[ 9561 - 4726 \]
2. \[ 3684 - 2369 \]
3. \[ 5190 - 4738 \]
4. \[ 7159 - 6037 \]
5. \[ 5483 - 2007 \]
6. \[ 8616 - 1208 \]
7. \[ 1700 - 1507 \]
8. \[ 9001 - 4090 \]
9. \[ 8784 - 1935 \]
10. \[ 6050 - 4967 \]
Subtract. Then check by addition.

11. \[3535 - 416 = 3119\]
12. \[2222 + 416 = 2638\]
13. \[4318 - 68 = 4250\]
14. \[6226 - 108 = 6118\]
15. \[74.19 - 1.27 = 72.92\]
16. \[90.00 - 7.03 = 82.97\]
17. \[17.63 - 2.96 = 14.67\]
18. \[45.72 - 21.84 = 23.88\]
19. \[50.43 - 18.52 = 31.91\]

Making Change with Larger Numbers

Leroy buys a model jet for $17.50. He pays with two $10 dollar bills. What change can the cashier give him?

First add: \[10 + 10 = 20\]
Then subtract and count on to make change.

The cashier can give Leroy 2 one-dollar bills and 2 quarters.

Remember: There are many ways to make change.

Problem Solving

20. Len buys a book for $13.49. He pays with a $5 and a $10 bill. How can the cashier give him change?

21. Amy buys a video for $16.99. She pays with two $10 bills. What change might Amy get?

22. Luna buys a compact disc for $11.98. She has a $5 bill, a $10 bill, and a $20 bill. Which two bills might Luna give the cashier? What change can she get?

23. Max buys a game for $15.98. He has two $10 bills and a $5 bill. Which two bills might Max give the cashier? What change can Max receive?
Choose a Computation Method

You can use mental math or paper and pencil to subtract.

**Subtract:**

\[ 5000 - 3050 = ? \]
\[ 472 - 191 = ? \]

To find each difference, first look at the numbers and determine which method is easier for you. Then subtract.

**Mental Math**

\[ 5000 - 3050 = ? \]

**Think**

I can subtract 50 from both 5000 and 3050, then subtract 4950 - 3000 mentally. 1950

**Paper and Pencil**

\[ 472 - 191 = ? \]

**Think**

Are the numbers too hard to subtract mentally? Yes. First estimate by rounding. Then use paper and pencil.

\[
\begin{array}{c}
472 \\
-191 \\
\hline
281
\end{array}
\]

There is no one correct method to use. Use whichever method is easier for you.

**Practice**

Subtract. Tell which method you used and why.

1. \[ 550 - 105 = ? \]
2. \[ $8.06 - $1.39 = ? \]
3. \[ 9460 - 5210 = ? \]
4. \[ 500 - 498 = ? \]
5. \[ $6.00 - $2.50 = ? \]
6. \[ 7178 - 5129 = ? \]
Exact Answer or Estimate

When solving a problem sometimes you need an exact answer and sometimes an estimate is enough.

Read the following problem. Decide whether to estimate or to find an exact answer.

Richard tells Terry that there are about 100 more dogs than cats at the shelter where he works. There are 172 dogs and 96 cats. Is Richard correct?

Think:

Richard said about 100 more. This is not an exact number. You can estimate.

172 rounds to 200.
96 rounds to 100.

\[ 200 - 100 = 100 \]

Richard is correct.

Solve. Explain why you gave an estimate or an exact answer.

7. Mr. Ross hopes he can sell 200 more videos in his store this month than he did last month. Last month he sold 432 videos. This month he sells 591. Did Mr. Ross reach his goal?

8. In one evening about 7000 bats were counted in one cave. About 6000 bats were counted in a second cave. How many fewer bats were in the second cave?

9. Ms. Jamison has a goal of selling 5000 toy figures in her chain of stores in the next three months. In January 1273 figures were sold. In February 2449 figures were sold. How many more figures does Ms. Jamison need to sell to meet her goal?

10. A group of rangers said that about 3000 more deer would be sighted in their territory this year than last year. Last year 1784 deer were sighted. This year 4159 were sighted. Were the rangers correct?
Problem-Solving Strategy:
Choose the Operation

There are 54 straw baskets and 28 painted baskets on sale. How many baskets are on sale?

Read

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

Facts: 54 straw baskets
       28 painted baskets

Question: How many baskets are on sale?

Plan

Choose the operation to use. Decide whether to add or subtract.

You are joining two unequal sets, so add. 54 + 28 = ?

Solve

First estimate the sum by rounding.

\[ 54 + 28 \rightarrow 50 + 30 = 80 \]

Then add.

\[
\begin{array}{c}
54 \\
+ 28 \\
\hline
82
\end{array}
\]

There are 82 baskets on sale.

Check

Compare the estimate and the actual sum. The actual sum, 82, is close to the estimated sum, 80. The answer is reasonable.
Choose the operation to solve each problem.

1. There are 54 straw baskets and 28 painted baskets on sale. How many more straw baskets are there than painted baskets?

**Read**

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

**Facts:**
- 54 straw baskets
- 28 painted baskets

**Question:** How many more straw baskets are there?

**Think**

First estimate the difference. Then subtract.

**Plan**

To find how many more, subtract. \( 54 - 28 = ? \)

**Solve**

**Check**

2. Ms. Thomer spent $16.85 for rug cleaner, $9.20 for car polish, and $23.99 for seat covers. What was her total bill?

3. Glen must stack 173 hubcaps on a rack. He has already stacked 96 hubcaps. How many more hubcaps must he stack?

4. On the first day of a sale, 1902 people came into the store. On the second day, 1786 people came. How many more people came on the first day?

5. At the end of the sale, there were 92 cans of motor oil left. If 297 cans were sold, how many cans had been on sale?

6. Choose an operation. Write your own problem. Then solve it.
Solve each problem and explain the method you used.

1. Fifty-six students of Central School take music lessons. Twelve of them play more than one instrument. How many students play one instrument?

2. Leon practices 155 minutes a week. So far this week he has practiced 105 minutes. How much longer does he need to practice?

3. The school chorus has 37 third graders and 45 fourth graders. How many third and fourth graders are in the chorus?

4. There are 53 students in the band. Twenty-six of them are boys. There are 5 trumpet players. How many girls are in the band?

5. A shipment of 200 tapes was on sale. The music store sold 116 tapes. How many tapes were not sold?

6. One year a music store sold 1005 instruments. It sold 568 instruments the next year. How many more instruments were sold in the first year?

7. Rosa wants to buy a tape for $9.29. She has $6.35. About how much more money does she need?

8. Eric gave the cashier $35.00. He got $1.72 in change. How much money did he spend at the music store?
Choose a strategy from the list or use another strategy you know to solve each problem.

9. A music box usually sells for $6.00. The sale price is $1.05 less. How much does a music box cost on sale?

10. Seven students sold T-shirts to raise money for the band. The first student sold 3 shirts, the second sold 2 more than the first, the third sold 2 more than the second, and so on. How many shirts did the seventh student sell?

11. Marsha practiced the flute for double the minutes Silvio practiced. Together they practiced for 90 minutes. How long did each student practice?

12. Every fourth CD sold at the music store is country and western. One day 26 CDs were sold. How many were country and western?

13. The music store offers an entertainment center for 8500 coupons. Mrs. Adams has saved 4613 coupons. Mr. Adams has saved 2372. How many more coupons do they need?

14. Frank bought a music book for $8.79. His cousin paid $9.75 for a tape. If Frank paid with ten dollars, how much change did he get?

Use the graph for problems 15–16.

15. How many more people liked country and western than classical music?

16. How many people were surveyed in all?
Check Your Progress
Lessons 1–13

Regroup.

1. 5 tens 6 ones =
   ? tens ? ones

2. 7 tens 1 one =
   ? tens ? ones

3. 6 hundreds 0 tens =
   ? hundreds ? tens

4. 3 hundreds 6 tens =
   ? hundreds ? tens

5. 9 thousands 0 hundreds =
   ? thousands ? hundreds

6. 8 thousands 4 hundreds =
   ? thousands ? hundreds

7. 5 dimes 3 pennies =
   ? dimes ? pennies

8. 3 dollars 5 dimes =
   ? dollars ? dimes

Subtract and check.

9. 55
   - 15
   40

10. 89
    - 67
    22

11. 325
    - 219
    106

12. $7.66
    - 4.27
    $3.39

13. $8.47
    - 5.38
    $3.09

14. 823
    - 36
    787

15. 600
    - 478
    122

16. $7.24
    - 4.93
    $2.31

17. $5.36
    - .75
    $4.61

18. $9.07
    - 7.17
    $1.90

19. 6875
    - 1729
    5146

20. 8000
    - 75
    7925

21. 5702
    - 2578
    3124

22. $68.37
    - 24.75
    $43.62

23. $72.03
    - 58.75
    $13.28

Estimate the difference. Use rounding.

24. 38
    - 17
    21

25. 209
    - 136
    73

26. $4.95
    - 2.31
    $2.64

27. $97.04
    - 53.68
    $43.36

28. 1061
    - 457
    604

Problem Solving

29. Alexandra collected 100 marbles. Jeanelle collected 67 marbles. How many more marbles does Alexandra have than Jeanelle?

30. A school has 475 students. There are 248 girls. How many boys are there?
Roman Numerals

The ancient Romans used letters for writing numbers. The numbers on the clock show one way Roman numerals can be used.

Each letter has a special value.

\[
I = 1 \quad V = 5 \quad X = 10 \quad L = 50
\]

▶ Find the value of IX.

The value of I is less than X.

So to find the value of IX, subtract.

\[
IX = 10 - 1 = 9
\]

▶ Find the value of LI.

The value of L is greater than I.

So to find the value of LI, add.

\[
LI = 50 + 1 = 51
\]

For exercises 1–4 which operation(s), addition or subtraction, can be used to find the value of each?

1. XII
2. IV

5. Write the Roman numerals from 21 to 40.

7. What is the difference of \( XV - IX \)?

3. LV
4. XIX

6. Write your age in Roman numerals.

8. What is the sum of \( XXI + L \)?
Chapter 3 Test

Regroup.

1. 5 hundreds 5 tens = ? hundreds ? tens
2. 3 thousands 6 hundreds = ? thousands ? hundreds
3. 8 dimes 2 pennies = ? dimes ? pennies
4. 8 dollars 7 dimes = ? dollars ? dimes

Subtract and check.

5. 83 6. 800
   − 25 − 638
7. 436
   − 27
8. $.68
   − .49
9. $5.27
   − 1.36

10. $8.05 11. 3052
    − 3.17 − 121
12. 7246
    − 3857
13. 4006
    − 1728
14. $42.36
    − 29.17

Estimate the difference by rounding.

15. 87 16. 438
    − 37 − 162
17. $6.99
    − 3.46
18. $.53
    − .22
19. 5298
    − 1910

Find the difference.

20. 740 − 82
21. $8.75 − $1.79

Problem Solving

Use a strategy you have learned.

22. In March our school collected 890 pounds of paper. The eighth grade collected 346 pounds. How many pounds did the other grades collect altogether?

Tell About It

23. One of Sue’s homework answers looked like this: 579 − 32 = 259. What error did she make? Find the correct answer.

Performance Assessment

Use the numbers in the box to write subtraction sentences that will give a difference of:

24. 100 25. about 200 26. 7382
    439 538
    8020 638
    7920 339
### Test Preparation

**Choose the best answer.**

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<tr>
<td><strong>1.</strong> Choose the standard form of the number.</td>
<td><strong>9.</strong> Choose the standard form of the number.</td>
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<td>7 hundreds 9 tens 0 ones</td>
<td>6 ten thousands</td>
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<td>a. 709</td>
<td>a. 6,000</td>
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<td>b. 790</td>
<td>b. 16,000</td>
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<td>c. 970</td>
<td>c. 60,000</td>
<td></td>
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<td>d. 7090</td>
<td>d. 600,000</td>
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<td><strong>2.</strong> Which statement is <em>not</em> true?</td>
<td><strong>10.</strong> Choose the order from least to greatest.</td>
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<tr>
<td>a. 37 &lt; 73</td>
<td>a. 9325; 9436; 9427</td>
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<tr>
<td>b. 7440 &gt; 7420</td>
<td>b. 9436; 9427; 9325</td>
</tr>
<tr>
<td>c. $8.72 &gt; $7.99</td>
<td>c. 9436; 9325; 9427</td>
</tr>
<tr>
<td>d. 534 &lt; 529</td>
<td>d. 9325; 9427; 9436</td>
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<td><strong>3.</strong> Round to the nearest thousand.</td>
<td><strong>11.</strong> Round to the nearest dollar.</td>
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<td>6583</td>
<td>2.26</td>
<td>a. 5000</td>
<td>a. $1.00</td>
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<tr>
<td>a. 5000</td>
<td>b. $1.00</td>
<td>b. 6000</td>
<td>b. $2.00</td>
</tr>
<tr>
<td>c. 6600</td>
<td>c. $2.30</td>
<td>d. 7000</td>
<td>d. $3.00</td>
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<td><strong>4.</strong> What is the missing number?</td>
<td><strong>12.</strong> Which number is at least 200 more than 5319 and has 5 in the thousands place?</td>
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<td>23, 27, 31, 35, ?</td>
<td>a. 5119</td>
</tr>
<tr>
<td>a. 21</td>
<td>b. 5518</td>
</tr>
<tr>
<td>b. 36</td>
<td>c. 5520</td>
</tr>
<tr>
<td>c. 37</td>
<td>d. 7519</td>
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<td>d. 39</td>
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<td><strong>5.</strong> 635 + 195</td>
<td><strong>13.</strong> Estimate.</td>
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<tr>
<td>635</td>
<td>4739</td>
<td>a. 2000</td>
<td></td>
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<tr>
<td>a. 760</td>
<td>b. 4000</td>
<td>b. 897</td>
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</tr>
<tr>
<td>+ 195</td>
<td>c. 5000</td>
<td>c. 816</td>
<td></td>
</tr>
<tr>
<td>d. 730</td>
<td>d. 8000</td>
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<td><strong>6.</strong> $7.56 + $2.25 + $.30</td>
<td><strong>14.</strong> 309 + 75 + 432</td>
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<tr>
<td>a. $9.11</td>
<td>a. 1491</td>
<td>a. 161</td>
<td></td>
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<tr>
<td>b. $9.11</td>
<td>b. 897</td>
<td>b. 249</td>
<td></td>
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<tr>
<td>c. $12.81</td>
<td>c. 816</td>
<td>c. 251</td>
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<td>d. $10.01</td>
<td>d. 806</td>
<td>d. not given</td>
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<td><strong>7.</strong> $6.70 - $.98</td>
<td><strong>15.</strong> 900 - 749</td>
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<tr>
<td>a. $5.72</td>
<td>a. 161</td>
<td>a. 161</td>
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</tr>
<tr>
<td>b. $6.28</td>
<td>b. 249</td>
<td>b. 249</td>
<td></td>
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<tr>
<td>c. $7.68</td>
<td>c. 251</td>
<td>c. not given</td>
<td></td>
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<tr>
<td>d. not given</td>
<td>d. not given</td>
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<td><strong>8.</strong> $9.69 - 3.78</td>
<td><strong>16.</strong> 5007 - 2839</td>
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<tr>
<td>a. $3.00</td>
<td>a. 2168</td>
<td>a. 2168</td>
<td></td>
</tr>
<tr>
<td>b. $6.00</td>
<td>b. 2172</td>
<td>b. 2172</td>
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<tr>
<td>c. $8.00</td>
<td>c. 7846</td>
<td>c. 7846</td>
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<tr>
<td>d. $9.00</td>
<td>d. 3832</td>
<td>d. 3832</td>
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17. 308  
   452  
   + 176  
   835  
   836  
   925  
   936

23. Estimate.  
   \[ \frac{8099}{3721} \]  
   a. 4,000  
   b. 5,000  
   c. 6,000  
   d. 12,000

18. Choose the order from greatest to least.  
   a. 568; 865; 685  
   b. 865; 685; 568  
   c. 568; 865; 685  
   d. 865; 685; 658

24. Which statement is true?  
   a. \$.10 = 1¢  
   b. 7201 < 7,102  
   c. 800 + 9 = 809  
   d. 303 > 330

19. $.61 - $.39  
   a. $.22  
   b. $.32  
   c. $.38  
   d. $1.00

25. 34 + 6079  
   a. 6003  
   b. 6113  
   c. 6419  
   d. 9479

20. 108 + 240 + 273 + 156  
   a. 666  
   b. 677  
   c. 776  
   d. 777

26. Choose the standard form of the number.  
   \[ 4000 + 10 + 5 \]  
   a. 415  
   b. 4015  
   c. 4105  
   d. 4510

21. 7 = \_ + 7  
   a. 0  
   b. 1  
   c. 14  
   d. not given

27. 409  
   + 87  
   496  
   a. 486  
   b. 496  
   c. 586  
   d. not given

22. Jefferson County has 1497 fewer pets than Lansing County. Lansing County has 7348 pets.  
   How many pets does Jefferson County have?  
   a. 5151  
   b. 5851  
   c. 6251  
   d. 6851

28. Alicia buys a bracelet for $4.65. She gives the cashier $5.00. What is her change?  
   a. $.35  
   b. $.65  
   c. $1.35  
   d. $9.65

29. Assume that the cashier in problem 28 has no nickels. Use the strategy Draw a Picture to show six ways she could give the change.

30. There are 328 blue cars, 126 green cars, and 98 black cars in the parking lot. How many more blue cars than green cars are there?
In this chapter you will:
Multiply numbers and cents by 0 through 5
Understand order in multiplication
Learn about missing factors
Solve problems by using more than one step

Critical Thinking/Finding Together
Count by 2s to find how many sheep the boy counted before falling asleep. Write an addition sentence to show this.

Sweet Dreams
I wonder as into bed I creep
What it feels like to fall asleep.
I’ve told myself stories, I’ve counted sheep.
But I’m always asleep when I fall asleep.
Tonight my eyes I will open keep,
And I’ll stay awake till I fall asleep,
Then I’ll know what it feels like to fall asleep,
Asleep,
Asleep,
Asleep . . .

Ogden Nash
There are 3 boxes of honey jars. Each box holds 2 jars. How many jars of honey are there in all?

You can use repeated addition to find how many in all.

**Think**
3 groups of 2
Count by 2s three times.
2, 4, 6

\[2 + 2 + 2 = 6\]

3 twos = 6

The addends in the addition sentence represent the number in each group.

There are 3 addends in the addition sentence. This number represents the number of equal groups.

You can also write a multiplication sentence when joining equal groups.

\[3 \times 2 = 6\] or \[\times 3\] in each group

There are 6 jars in all.
Find how many in all.

1. \(4 + 4 + 4 = 12\)  
2. \(5 + 5 = ?\)  
3. \(3 + 3 + 3 + 3 = ?\)

- 3 fours = 12
- 2 fives = ?
- 4 threes = ?

- \(3 \times 4 = 12\)
- \(2 \times 5 = ?\)
- \(4 \times 3 = ?\)

Write an addition sentence and a multiplication sentence to show how many in all.

4. \(\square\)  
5. \(\square\)  
6. \(\square\)  
7. \(\square\)

Solve each multiplication.

8. \(2 \times 3 = \frac{?}{6}\)  
9. \(1 \times 5 = ?\)  
10. \(5 \times 2 = ?\)

11. \(4 \times 5 = ?\)  
12. \(2 \times 2 = ?\)  
13. \(1 \times 4 = ?\)  
14. \(5 \times 5 = ?\)

15. \(\frac{4}{2}\)  
16. \(\frac{3}{1}\)  
17. \(\frac{2}{5}\)  
18. \(\frac{4}{4}\)

19. Look at exercises 1–7. Compare the addition sentences with the multiplication sentences. What do you notice?

20. What does the first number in each multiplication sentence represent?

21. What does the second number in each multiplication sentence represent?

22. How is multiplication like addition?

23. Explain how you could use multiplication to find \(5 + 5 + 5\).
There are 4 mailboxes. There is 1 letter in each mailbox. How many letters are there in all?

To find how many in all, multiply:

\[ 4 \times 1 = 4 \text{ or } 1 \times 4 \]

number of groups \hspace{1cm} number in each group \hspace{1cm} number in all

Identity Property of Multiplication

- When you multiply any number and 1, the answer is that number.

There are 3 mailboxes. Each mailbox has 0 letters. How many letters are there in all?

To find how many in all, multiply:

\[ 3 \times 0 = 0 \text{ or } 0 \times 3 \]

groups \hspace{1cm} in each group \hspace{1cm} in all

Zero Property of Multiplication

- When you multiply any number and 0, the answer is 0.

Multiply.

1. \(3 \times 1\) \hspace{1cm} 2. \(4 \times 0\) \hspace{1cm} 3. \(1 \times 9\) \hspace{1cm} 4. \(5 \times 0\) \hspace{1cm} 5. \(0 \times 7\)
6. \(1 \times 5\) \hspace{1cm} 7. \(1 \times 3\) \hspace{1cm} 8. \(0 \times 5\) \hspace{1cm} 9. \(1 \times 4\) \hspace{1cm} 10. \(0 \times 3\)
11. \(2 \times 1\) \hspace{1cm} 12. \(6 \times 1\) \hspace{1cm} 13. \(0 \times 2\) \hspace{1cm} 14. \(0 \times 1\) \hspace{1cm} 15. \(1 \times 1\)
Multiplication Language

Here are some special words to learn.

**Factors** are the numbers you multiply.  $2 \times 3 = 6$

**Product** is the answer when you multiply.  $4 \times 1 = 4$

Write each multiplication in two ways: horizontal and vertical.

16. My factors are 3 and 1. What is my product?

17. My factors are 1 and 5. What is my product?

18. My product is 0. What must one of my factors be?

19. My product is 1. What must both of my factors be?

Draw a picture and write a multiplication sentence to represent each.

20. 5 groups of 1

21. 2 groups of 0

22. 1 group of 4

23. 0 groups of 3

TEST PREPARATION

24. Which multiplication sentence is false? Explain why.

   A  $24 \times 0 = 0$
   B  $33 \times 1 = 33$
   C  $1 \times 16 = 16$
   D  $18 \times 0 = 18$
Multiply Twos

Each card holds 2 stickers. How many stickers are there in all?

To find how many stickers in all, multiply: $5 \times 2 = \, ?$.

5 groups of 2
Count by 2s five times.
2, 4, 6, 8, 10

There are 10 stickers in all.

Find the product.

1. 4 twos $= \, ?$
   $4 \times 2 = \, ?$

2. 6 twos $= \, ?$
   $6 \times 2 = \, ?$

3. 2 twos $= \, ?$
   $2 \times 2 = \, ?$

4. 3 twos $= \, ?$
   $3 \times 2 = \, ?$

5. 7 twos $= \, ?$
   $7 \times 2 = \, ?$

6. 9 twos $= \, ?$
   $9 \times 2 = \, ?$
Multiply to find the product.

7. \[2 \times 8\]

8. \[2 \times 0\]

9. \[2 \times 10\]

Write a multiplication sentence for each repeated addition.

10. \[2 + 2 + 2\]

11. \[2 + 2 + 2 + 2 + 2\]

12. \[2 + 2\]

13. \[2 + 2 + 2 + 2\]

Find the product.

14. \[1 \times 2\]

15. \[4 \times 2\]

16. \[0 \times 2\]

17. \[2 \times 2\]

18. \[2 \times 5\]

19. \[2 \times 6\]

20. \[2 \times 7\]

21. \[2 \times 8\]

22. \[2 \times 3\]

23. \[2 \times 9\]

24. \[2 \times 0\] \[2 \times 1\] \[2 \times 2\] \[2 \times 3\] \[2 \times 4\] \[2 \times 5\] \[2 \times 6\] \[2 \times 7\] \[2 \times 8\] \[2 \times 9\] \[2 \times 10\]

Copy and complete the table. Describe any pattern you see.

25. Susan puts 9 packs of CDs in her cart. There are two CDs in each pack. How many CDs are in her cart?

26. Carlos buys seven packs of CDs. Each pack has two CDs in it. How many CDs does he buy in all?

27. When one factor is 2, is the product always even? Explain why or why not.
Multiply Threes

Each pack has 3 cartons of juice. How many cartons of juice are there in all?

To find how many cartons in all, multiply: \( 6 \times 3 = {?} \).

Think:
- 6 groups of 3
- Count by 3s six times.
- 3, 6, 9, 12, 15, 18

Six times three equals eighteen.

There are 18 cartons in all.

Find the product.

1. 4 threes = ?
   \[ 4 \times 3 = {?} \]

2. 5 threes = ?
   \[ 5 \times 3 = {?} \]

3. 8 threes = ?
   \[ 8 \times 3 = {?} \]

4. ? threes = ?
   \[ 2 \times 3 = {?} \]

5. ? threes = ?
   \[ 7 \times 3 = {?} \]

6. ? threes = ?
   \[ 9 \times 3 = {?} \]
Multiply.

7. \[
\begin{array}{c}
3 \\
\times 3
\end{array}
\]

8. \[
\begin{array}{c}
3 \\
\times 6
\end{array}
\]

9. \[
\begin{array}{c}
3 \\
\times 0
\end{array}
\]

Write a multiplication sentence for each repeated addition.

10. \[3 + 3 + 3 + 3 + 3 + 3\]
11. \[3 + 3 + 3 + 3 + 3\]
12. \[3 + 3 + 3\]

Find the product.

13. \[8 \times 3\]
14. \[4 \times 3\]
15. \[10 \times 3\]
16. \[9 \times 3\]
17. \[2 \times 3\]
18. \[5 \times 3\]
19. \[7 \times 3\]
20. \[6 \times 3\]
21. \[3 \times 4\]
22. \[3 \times 9\]
23. \[3 \times 8\]
24. \[3 \times 3\]
25. \[3 \times 1\]
26. \[3 \times 0\]

Copy and complete the table. Describe any pattern you see.

27. | \[\times 0\] | \[\times 1\] | \[\times 2\] | \[\times 3\] | \[\times 4\] | \[\times 5\] | \[\times 6\] | \[\times 7\] | \[\times 8\] | \[\times 9\] | \[\times 10\] |
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</table>

Draw a picture. Show all your work.

28. Katy buys 7 packs of apple juice. There are 3 cartons in each pack. How many cartons does Katy buy in all?

29. Tom bought 4 packs of grape juice. Each pack had 3 cartons in it. How many cartons of grape juice did Tom buy?
Multiply Fours

Each box contains 4 golf balls. How many golf balls are there in all?

To find how many golf balls in all, multiply: \(6 \times 4 = \Box\).

\[
\begin{array}{cccccc}
4 & +4 & +4 & +4 & +4 & +4 \\
\end{array}
\]

\begin{itemize}
\item Think
\item 6 groups of 4
\item Count by 4s six times.
\item 4, 8, 12, 16, 20, 24
\end{itemize}

\[4 \times 6 = 24 \quad \text{or} \quad \frac{6 \times 4}{24}\]

Six times four equals twenty-four.

There are 24 golf balls in all.

Find the product.

Practice

1. \(2 \text{ fours} = \Box\) \[2 \times 4 = \Box\]

2. \(1 \text{ four} = \Box\) \[1 \times 4 = \Box\]

3. \(7 \text{ fours} = \Box\) \[7 \times 4 = \Box\]

4. \(\Box \text{ fours} = 0\) \[0 \times 4 = \Box\]

5. \(\Box \text{ fours} = 40\) \[10 \times 4 = \Box\]

6. \(\Box \text{ fours} = 16\) \[4 \times 4 = \Box\]
Write a multiplication sentence for each repeated addition.
7. $4 + 4$  
8. $4 + 4 + 4 + 4 + 4 + 4$  
9. $4 + 4 + 4$

Write a multiplication sentence for each model.
10.  
11.  
12.  

Find the product.
13. $2 \times 4$  
14. $5 \times 4$  
15. $6 \times 4$  
16. $7 \times 4$  
17. $4 \times 0$  
18. $4 \times 8$  
19. $4 \times 9$  
20. $4 \times 3$  
21. $4 \times 1$  
22. $4 \times 4$

Copy and complete the table.
Describe any pattern you see.
23.  

Problem Solving
24. Joan puts her golf shirts in 3 drawers. Each drawer has 4 golf shirts. How many golf shirts does Joan have?

25. Golf balls come 4 in each box. Mario gets 6 boxes. Tiger gets 8 boxes. How many more does Tiger get than Mario?

Challenge
26. I am between $9 \times 4$ and $8 \times 4$. I am an even number. What am I?

27. I am greater than $5 \times 4$. I am less than $6 \times 4$. I am an odd number. I am not 21. What am I?
Multiply Fives

Each bowl holds 5 lemons. How many lemons are there in all?

To find how many lemons in all, multiply: \(4 \times 5 = ?\).

\[
\begin{array}{c}
5 \\
+5 \\
+5 \\
+5 \\
= 20
\end{array}
\]

Think:
- 4 groups of 5
- Count by 5s four times.
- 5, 10, 15, 20

There are 20 lemons in all.

Find the product.

1. 3 fives = ?
   \[3 \times 5 = ?\]

2. 1 five = ?
   \[1 \times 5 = ?\]

3. 5 fives = ?
   \[5 \times 5 = ?\]

4. 0 fives = 0
   \[0 \times 5 = ?\]

5. \(\_\_\_\) fives = ?
   \[\_\_\_ \times 5 = ?\]

6. \(\_\_\_\) fives = ?
   \[\_\_\_ \times 5 = ?\]
Write a multiplication sentence for each repeated addition.

7. $5 + 5 + 5 + 5$  
8. $5 + 5 + 5$  
9. $5 + 5 + 5 + 5 + 5$

Write a multiplication sentence for each model.

10.  
11.  
12.  

Find the product.

13. $3 \times 5$  
14. $9 \times 5$  
15. $7 \times 5$  
16. $8 \times 5$  
17. $10 \times 5$

18. $5 \times 2$  
19. $5 \times 5$  
20. $5 \times 1$  
21. $5 \times 6$  
22. $5 \times 0$

Copy and complete the table. Describe any pattern you see.

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<th>5</th>
<th>5</th>
</tr>
</thead>
</table>

Problem Solving

24. Roberto buys 3 bags of limes. Each bag has 5 limes in it. How many limes are there in all?

25. Marie squeezes 5 lemons in each of 4 pitchers. Tina and Paul each do the same. How many lemons do they all use?

Write About It

26. A wild rabbit can have babies 5 times in one year. Each time, the wild rabbit may have between 3 and 7 babies. Suppose 2 wild rabbits each had babies 3 times in one year, each time having 5 baby rabbits. How many baby rabbits would the two wild rabbits have in one year? Explain.
Multiply Cents

Carmen groups her pennies by twos. How much money does she have?

To find the amount of money:

- Multiply first.
- Then write the ¢ sign.

\[
\frac{2¢ \text{ cents in each group} \times 4 \text{ number of groups}}{8¢ \text{ cents in all}}
\]

Carmen has 8¢ in all.

Multiply first. Then write the ¢ sign.

1. 3¢ \times 3
2. 2¢ \times 6
3. 3¢ \times 5
4. 5¢ \times 6
5. 2¢ \times 7
6. 4¢ \times 8
7. 5¢ \times 7
8. 4¢ \times 10
9. 3¢ \times 4
10. 2¢ \times 3
11. 4¢ \times 4
12. 1¢ \times 9
13. 0¢ \times 3
Multiply mentally.

14. \(3 \times 2\)  
15. \(4 \times 3\)  
16. \(6 \times 4\)  
17. \(3 \times 5\)  
18. \(8 \times 5\)c  
19. \(9 \times 2\)c  
20. \(9 \times 3\)c  
21. \(7 \times 4\)c  
22. \(8 \times 3\)c  
23. \(5 \times 5\)c  
24. \(1 \times 4\)c  
25. \(8 \times 2\)c  

Find the product.

26. \(0 \times 2\)  
27. \(3 \times 2\)  
28. \(4 \times 5\)  
29. \(5 \times 10\)  
30. \(4 \times 3\)  
31. \(3 \times 7\)  
32. \(2 \times 5\)  
33. \(3 \times 0\)  
34. \(2 \times 6\)  
35. \(5 \times 9\)  
36. \(4 \times 9\)  
37. \(5 \times 1\)  
38. \(5\)c \(\times 4\)  
39. \(3\)c \(\times 8\)  
40. \(5\)c \(\times 3\)  
41. \(4\)c \(\times 4\)  
42. \(5\)c \(\times 8\)  
43. \(4\)c \(\times 2\)  

Problem Solving

44. If there are 3 canoes that hold 2 people and 4 canoes that hold 4 people, how many people can the canoes hold all together?

45. Kim needs to buy toy rowboats for herself and 6 friends. If each rowboat costs 5c, how much does she pay?

DO YOU REMEMBER?

Regroup.

46. 15 hundreds =  
? thousand  ? hundreds  
47. 18 hundreds =  
? thousand  ? hundreds  
48. 7 thousands =  
? thousands  ? hundreds  
49. 9 thousands =  
? thousands  ? hundreds
Add to find sums. Subtract to find differences. Multiply to find products.

\[
\begin{array}{cccc}
1 & 1 & 1 & 9 & 10 \\
2486 & 7 & 0 & 10' & 8 & 0 & 10' \\
+3867 & -5 & 9 & 8 & 2 & 2 & 0 & 2 & 8 \\
\hline
6353 & & & & & & & & \text{sum} & \text{difference} & \text{product}
\end{array}
\]

Add, subtract, or multiply. Watch the signs.

1. 234 2. 641 3. 423 4. 536 5. 948
   + 545 − 230 − 115 + 318 − 376

6. 335 7. 2663 8. 6574 9. 4098 10. 8406
   + 189 + 4728 − 2978 + 1927 − 3217

11. 5 12. 3 13. 4 14. 3 15. 0
   \times 7 \times 8 \times 0 \times 9 \times 1

16. 742 17. 4307 18. 3\text{¢} 19. 2 20. 1178
   + 370 − 3244 \times 7 \times 6 + 6847

21. $.89 22. $.47 23. 4 24. 5 25. $5.55
   − .53 + .39 \times 7 \times 6 − 2.22

26. 5\text{¢} 27. 3\text{¢} 28. $4.08 29. $3.29 30. 5\text{¢}
   \times 8 \times 4 + 3.75 − 1.77 \times 1

31. 7215 32. 5863 33. 5 34. 2 35. 6374
   + 1824 − 4778 \times 9 \times 8 + 1696
36. Class 3B has 3 violins. Each violin has 4 strings. If the class gets 5 more violins, how many strings will they have in all?

37. Eduardo bought gifts for three of his friends. The gifts cost $2.49, $3.29, and $2.98. What was the total cost of the gifts?

38. Emma put 75 pictures in her photo album. It holds 144 pictures. How many more pictures can Emma put in her album?

39. Jake has 9 packs of baseball cards. There are 5 cards in each pack. How many baseball cards does Jake have in all?

40. Mark’s family traveled 296 miles in one day and 135 miles the next day. If Mark’s family wants to travel 500 miles altogether, how many more miles do they need to travel on the third day?

41. Dorotea bought a pencil eraser. She paid 5 nickels for the eraser. How much did she spend?

42. Chad bought 6 model sailboats at $5 each. Maris bought 8 model planes at $3 each. Who spent more? How much more?

43. \[ 2 \times 4 \]
44. \[ \begin{array}{c} 721 \\ +333 \end{array} \]
45. \[ 0 \times 8 \]
46. \[ 5 \times 10 \]

47. \[ $9.00 - 2.31$ \]
48. \[ 5263 + 2986 \]
49. \[ 5\text{¢} \times 4 \]
50. \[ 9 + 9 \]
How many cars are there?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Factor</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5 \times 3$</td>
<td>$5 \times 3$</td>
<td>$15$</td>
</tr>
<tr>
<td>$3 \times 5$</td>
<td>$3 \times 5$</td>
<td>$15$</td>
</tr>
</tbody>
</table>

There are 15 cars in all.

**Commutative Property of Multiplication**
- When you change the order of the factors, the product stays the same.

### Find the product.

<table>
<thead>
<tr>
<th>Number</th>
<th>Equation</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$3 \times 2 = 6$</td>
<td>$2 \times 3 = ?$</td>
</tr>
<tr>
<td>2</td>
<td>$4 \times 1 = 4$</td>
<td>$1 \times 4 = ?$</td>
</tr>
<tr>
<td>3</td>
<td>$2 \times 5 = 10$</td>
<td>$5 \times 2 = ?$</td>
</tr>
<tr>
<td>4</td>
<td>$1 \times 2 = 2$</td>
<td>$2 \times 1 = ?$</td>
</tr>
<tr>
<td>5</td>
<td>$4 \times 3 = 12$</td>
<td>$3 \times 4 = ?$</td>
</tr>
<tr>
<td>6</td>
<td>$2 \times 0 = 0$</td>
<td>$0 \times 2 = ?$</td>
</tr>
<tr>
<td>7</td>
<td>$5 \times 1 = ?$</td>
<td>$1 \times 5 = ?$</td>
</tr>
<tr>
<td>8</td>
<td>$4 \times 2 = ?$</td>
<td>$2 \times 4 = ?$</td>
</tr>
<tr>
<td>9</td>
<td>$0 \times 5 = 0$</td>
<td>$5 \times 0 = ?$</td>
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<tr>
<td>10</td>
<td>$4 \times 5 = ?$</td>
<td>$5 \times 4 = ?$</td>
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<tr>
<td>11</td>
<td>$8 \times 2 = ?$</td>
<td>$2 \times 8 = ?$</td>
</tr>
<tr>
<td>12</td>
<td>$6 \times 5 = ?$</td>
<td>$5 \times 6 = ?$</td>
</tr>
</tbody>
</table>
Multiply.

13. \[ \frac{3}{1} \times \frac{1}{3} = \frac{3}{3} \]
14. \[ \frac{4}{2} \times \frac{2}{4} = \frac{8}{8} \]
15. \[ \frac{1}{0} \times \frac{0}{1} = 0 \]
16. \[ \frac{10}{3} \times \frac{3}{10} = 1 \]
17. \[ \frac{2}{3} \times \frac{3}{2} = 1 \]
18. \[ \frac{5}{1} \times \frac{1}{5} = 1 \]
19. \[ \frac{3}{4} \times \frac{4}{3} = 1 \]
20. \[ \frac{2}{5} \times \frac{5}{2} = 1 \]
21. \[ \frac{0}{4} \times \frac{4}{0} = 0 \]
22. \[ \frac{5}{4} \times \frac{4}{5} = 1 \]
23. \[ \frac{2}{7} \times \frac{7}{2} = 1 \]
24. \[ \frac{3}{9} \times \frac{9}{3} = 1 \]

Draw dots or circles to show each.

25. \[ 5 \times 2 = 2 \times 5 \]
26. \[ 4 \times 1 = 1 \times 4 \]
27. \[ 3 \times 2 = 2 \times 3 \]
28. \[ 4 \times 3 = 3 \times 4 \]
29. \[ 1 \times 3 = 3 \times 1 \]
30. \[ 4 \times 5 = 5 \times 4 \]

Find the missing factor.

31. \[ 4 \times 2 = ? \times 4 \]
32. \[ 1 \times 2 = ? \times 1 \]
33. \[ 3 \times 5 = ? \times 3 \]
34. \[ 2 \times 5 = ? \times 2 \]
35. \[ ? \times 4 = 4 \times 5 \]
36. \[ ? \times 0 = 0 \times 1 \]

José puts 5 cars in each of 4 large toy chests.
Laurie puts 4 cars in each of 5 small toy chests.
Which person has more cars? Explain your answer.

38. Draw two different pictures to show a product of 12.
Then write a word problem for each.

CRITICAL THINKING

Compare. Write <, =, or >.

39. \[ 5 \times 3 ? 5 \times 4 \]
40. \[ 3 \times 3 ? 4 \times 4 \]
41. \[ 5 \times 2 ? 2 \times 5 \]
42. \[ 2 \times 0 ? 1 \times 0 \]
43. \[ 6 \times 4 ? 7 \times 2 \]
44. \[ 0 \times 0 ? 1 \times 1 \]
There are 8 bean bags in a bean bag toss game. Each player takes 2 bean bags. At most, how many can play the game?

To find the number of players, think:
What number times 2 equals 8?
Find the missing factor.

\[
\begin{array}{ccc}
\text{factor} & \times & 2 \\
? & \times & 2 = 8 \\
\text{number of groups} & \text{number in each group} & \text{number in all}
\end{array}
\quad
\begin{array}{ccc}
\text{product} & \div & 2 \\
8 & \div & 2 \\
\text{number in all} & \text{number of groups} & \text{number in each group}
\end{array}
\]

\[
\begin{align*}
4 \times 2 &= 8 \\
8 &= 4 \times 2
\end{align*}
\]

The missing factor is 4.
Four players with 2 bean bags each can play the game.

**Find the missing factor.**

1. \(? \times 3 = 12\)
2. \(? \times 5 = 15\)
3. \(? \times 3 = 9\)
Find the missing factor.

4. \(? \times 2 = 12\)
5. \(? \times 3\,\text{c} = 15\,\text{c}\)
6. \(? \times 5 = 20\)
7. \(? \times 4 = 12\)
8. \(2 \times \? = 20\)
9. \(2 \times \? = 8\)
10. \(1 \times \? = 5\)
11. \(4 \times \? = 4\)
12. \(? \times 3\,\text{c} = 18\,\text{c}\)
13. \(5 \times \? = 25\)
14. \(8 \times \? = 16\)
15. \(? \times 4\,\text{c} = 24\,\text{c}\)
16. \(20\,\text{c} = \? \times 4\,\text{c}\)
17. \(16 = \? \times 4\)
18. \(14 = 7 \times \?\)
19. \(27 = 9 \times \?\)
20. \(24 = 8 \times \?\)
21. \(9 \times \? = 18\)

Multiply.

22. \(4 \times 9\)
23. \(0 \times 8\)
24. \(5 \times 9\)
25. \(4 \times 10\)
26. \(5 \times 6\)
27. \(2 \times 5\)
28. \(3 \times 7\)
29. \(5 \times 0\)
30. \(1 \times 6\)
31. \(4 \times 8\)
32. \(2 \times 9\)
33. \(5 \times 8\)

Find the missing factor.

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<thead>
<tr>
<th>factor</th>
<th>factor</th>
<th>product</th>
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</thead>
<tbody>
<tr>
<td>34. 7</td>
<td>?</td>
<td>21</td>
</tr>
<tr>
<td>35. ?</td>
<td>5,\text{c}</td>
<td>30,\text{c}</td>
</tr>
<tr>
<td>36. 1</td>
<td>?</td>
<td>2</td>
</tr>
<tr>
<td>37. 7</td>
<td>?</td>
<td>35</td>
</tr>
<tr>
<td>38. ?</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>39. 7</td>
<td>?</td>
<td>14</td>
</tr>
<tr>
<td>40. ?</td>
<td>4,\text{c}</td>
<td>16,\text{c}</td>
</tr>
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<thead>
<tr>
<th>factor</th>
<th>factor</th>
<th>product</th>
</tr>
</thead>
<tbody>
<tr>
<td>41. 3</td>
<td>?</td>
<td>3</td>
</tr>
<tr>
<td>42. ?</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>43. 7</td>
<td>?</td>
<td>28</td>
</tr>
<tr>
<td>44. ?</td>
<td>5</td>
<td>45</td>
</tr>
<tr>
<td>45. ?</td>
<td>2,\text{c}</td>
<td>0,\text{c}</td>
</tr>
<tr>
<td>46. 9</td>
<td>?</td>
<td>18</td>
</tr>
<tr>
<td>47. ?</td>
<td>3,\text{c}</td>
<td>24,\text{c}</td>
</tr>
</tbody>
</table>

Use doubles to find each missing factor.

48. \(2 \times \? = 10\)
49. \(? \times 2 = 16\)
50. \(? \times 2 = 12\)
Problem-Solving Strategy: Use More Than One Step

Tricia dropped 85 pieces of her puzzle on the floor. Mark found 23 pieces, José found 29 pieces, and Tricia found 26 pieces. How many pieces are still missing?

**Visualize**

**Problem**

Reread the problem. Focus on the facts and the question.

**Facts:**
- 85 pieces dropped.
- Mark found 23 pieces.
- José found 29 pieces.
- Tricia found 26 pieces.

**Question:** How many pieces are still missing?

**Plan**

First find the number of pieces found. Add.

\[
\begin{align*}
23 & \quad + \\
29 & \quad + \\
26 & \quad = \\
\text{Mark's} & \quad \text{José's} & \quad \text{Tricia's} & \quad \text{number} \\
\text{pieces} & \quad \text{pieces} & \quad \text{pieces} & \quad \text{found}
\end{align*}
\]

Then, find the number of pieces still missing. Subtract the sum from 85:

\[
\begin{align*}
85 & \quad - \\
? & \quad = \\
\text{in} & \quad \text{number} & \quad \text{number} \\
\text{all} & \quad \text{found} & \quad \text{still missing}
\end{align*}
\]

**Solve**

\[
23 + 29 + 26 = 78
\]

They found 78 pieces.

\[
85 - 78 = 7
\]

There are 7 pieces still missing.

**Check**

Use addition to check your answer.

\[
78 + 7 = 85
\]

pieces found + pieces still missing = pieces in all
Use more than one step to solve each problem.

1. Cassy bought a box of crayons for 79¢ and four stickers for 5¢ each. How much money did she spend altogether?

First find the cost of 4 stickers.
Multiply: $4 \times 5¢ = \_?

Then find how much she spent altogether.
Add: $79¢ + \text{cost of stickers} = \_?

2. Marlo’s Pet Shop has 5 angelfish in each of 4 tanks. It has 4 guppies in each of 3 tanks. Ms. Fin bought all the guppies and angelfish. How many fish did she buy?

3. Jon needs 30 stamps to fill his stamp album. Each of 3 friends gives him 7 stamps. How many more stamps does Jon need?

4. Ken scored 9 points more than Josh. Renee scored two times the number of points scored by Josh. Josh scored 6 points. How many points did they score altogether?

5. Lauren collected 4 cans of food from each of 7 neighbors. Her goal is 35 cans of food for the poor. How many more cans does she need?
Solve each problem and explain the method you used.

1. Ana buys 3 favors for each of her 7 guests. How many favors does Ana have for her party?

2. Mrs. Yanni sets up 6 tables. She puts 5 chairs at one table and 4 chairs at the remaining tables. How many chairs are there in all?

3. Ana has a package of 32 balloons. Fifteen of them are red. The rest are yellow. How many yellow balloons does Ana have?

4. Darryl, Neil, and Russ each won 2 prizes. How many prizes did the boys win altogether?

5. Kimo found 5¢. Carl found 5 times as much money. How much money did Carl find?

6. Ana received $25 from her grandparents. She also received $5 from each of three friends. How much money did Ana receive?

7. Six children each won one prize in the first game. Three children won two prizes each in the second game. How many prizes in all did the children win in the two games?

8. Each of Marta’s 5 baskets has 4 flowers. Each of Cara’s 6 baskets has 3 flowers. Which girl has more flowers? How many more?
Choose a strategy from the list or use another strategy you know to solve each problem.

9. Ms. Reis has 35 guests. She seats 4 guests at each of the first 8 tables. How many guests sit at the ninth table?

10. José buys 4 baseball cards. Each card costs 5¢. He pays a quarter. How much change should he get?

11. Ned spent $2.80 more than Fred. Ken spent $1.25 less than Fred. Fred spent $5.00. How much did Ned spend? How much did Ken spend?

12. A magician pulled 12 rabbits from a hat. She pulled 1 more gray rabbit than white rabbits, and 1 more black rabbit than gray rabbits. How many rabbits of each color did she pull out of the hat?

13. A party store had 30 party hats. It sold 7 hats on Monday, 6 hats on Tuesday, 5 hats on Wednesday, 4 hats on Thursday, and so on. How many hats will be left at the end of the day on Saturday?

14. This graph shows the number of birthdays in 3 months. How many more birthdays are there in May than in April?

15. There are three times as many birthdays in June as in April. How many birthdays are there in June?

16. Use the data on the birthday graph to make up a problem. Then ask a classmate to solve it.
Check Your Progress
Lessons 1–12

Find the product.

1. 6 threes = ?
   6 \times 3 = ?

2. 5 fours = ?
   5 \times 4 = ?

Write a multiplication sentence for each repeated addition.

3. 5 + 5 + 5
4. 2 + 2
5. 4 + 4 + 4 + 4

Multiply.

6. 2 \times 4\text{¢}
7. 6 \times 4
8. 3 \times 2
9. 7 \times 5\text{¢}

10. 4 \times 0
11. 5 \times 3\text{¢}
12. 10 \times 4
13. 9 \times 1

14. \begin{array}{c}3 \\ \times 4 \end{array}
15. \begin{array}{c}3 \\ \times 9 \end{array}
16. \begin{array}{c}5\text{¢} \\ \times 9 \end{array}
17. \begin{array}{c}4 \\ \times 7 \end{array}
18. \begin{array}{c}2\text{¢} \\ \times 9 \end{array}
19. 0

Find the missing factor.

20. 8 \times 4 = ? \times 8
21. 7 \times 3 = ? \times 7
22. 2 \times 3 = ? \times 2

23. ? \times 3\text{¢} = 24\text{¢}
24. 4 \times ? = 16
25. ? \times 3\text{¢} = 0\text{¢}

26. 3 \times ? = 9
27. ? \times 5\text{¢} = 25\text{¢}
28. 16 = 8 \times ?

Problem Solving

29. There are 5 goldfish in each bowl. How many goldfish are in 6 bowls?

30. Rhea bought a guppy. She gave the clerk 98\text{¢} and 5 nickels. How much did the guppy cost?

(See Still More Practice, p. 462.)
Predict Patterns of Sums

Find the pattern. Copy and complete each sentence.

1. \(1 = \frac{1}{2} \times 1\)
2. \(1 + 3 = \frac{2}{2} \times 2\)
3. \(1 + 3 + 5 = \frac{3}{2} \times ?\)
4. \(1 + 3 + 5 + 7 = ? \times ?\)
5. \(1 + 3 + 5 + 7 + 9 = ? \times ?\)

Find and extend the pattern.

6. \(2, 4, 6, 8, 10, 12, 14\)
   \(1 \times 2, 2 \times 2, 3 \times 2, 4 \times 2\)
7. \(0, 3, 6, 9, ? , ? , ?\)
8. \(10, 15, 20, 25, ? , ? , ?\)
9. \(0, 4, 8, 12, ? , ? , ?\)
10. \(3, 5, 7, 9, ? , ? , ?\)
11. \(4, 7, 10, 13, ? , ? , ?\)
12. \(6, 11, 16, 21, ? , ? , ?\)

Look at the pattern in exercises 1–5. Predict the factors. Check using a calculator.

13. \(1 + 3 + 5 + 7 + 9 + 11 = ? \times ?\)
14. \(1 + 3 + 5 + 7 + 9 + 11 + 13 = ? \times ?\)
Chapter 4 Test

Multiply.

1. \(4 \times 3\)  
2. \(7 \times 2\)  
3. \(5 \times 3\)  
4. \(6 \times 4\)
5. \(9 \times 2\)  
6. \(5 \times 5\)  
7. \(8 \times 5\)  
8. \(7 \times 4\)
9. \(3 \times 6\)  
10. \(4 \times 9\)  
11. \(5 \times 6\)  
12. \(4 \times 0\)  
13. \(5 \times 4\)  
14. \(3 \times 7\)
15. \(2 \times 5\)  
16. \(4 \times 4\)  
17. \(3 \times 9\)  
18. \(4 \times 8\)  
19. \(10 \times 5\)  
20. \(2 \times 8\)

Find the missing factor.

21. \(? \times 5 = 35\)  
22. \(7 \times ? = 28\)  
23. \(? \times 2 = 12\)
24. \(3 \times 5 = ? \times 3\)  
25. \(2 \times 4 = ? \times 2\)  
26. \(? \times 3 = 3 \times 4\)

Problem Solving

Use a strategy you have learned.

27. Three players on the basketball team each scored 4 points. The other players on the team scored 15 points. How many points did the team score in all?

28. There are 5 books on each shelf. How many books are on 9 shelves?

Performance Assessment

Explain each property and give an example of each.

30. Identity Property of Multiplication  
31. Zero Property of Multiplication

Tell About It

29. Write and solve two multiplication sentences with the factors 6 and 3. Explain the property of multiplication that is used.
## Test Preparation

Choose the best answer.

1. $\begin{array}{c}
78 \\
+ 45
\end{array}$
   
   a. 33  
   b. 113  
   c. 123  
   d. 133

2. Round 2369 to the nearest thousand.
   
   a. 1000  
   b. 2000  
   c. 2400  
   d. 3000

3. $5 \times 1$
   
   a. 1  
   b. 4  
   c. 5  
   d. 6

4. $242 + 156$
   
   a. 86  
   b. 298  
   c. 380  
   d. 398

5. Estimate by rounding to the nearest dollar.
   
   $\begin{array}{c}
74.09 \\
- 39.82
\end{array}$
   
   a. $33  
   b. $34  
   c. $35  
   d. $36

6. $4 \times 7$
   
   a. 28  
   b. 24  
   c. 20  
   d. 11

7. $500 - 414$
   
   a. 86  
   b. 196  
   c. 914  
   d. not given

8. $29 + 86$
   
   a. 115  
   b. 106  
   c. 105  
   d. 57

9. Estimate by rounding to the nearest dollar.
   
   $\begin{array}{c}
9.12 \\
+ 7.50
\end{array}$
   
   a. $1  
   b. $2  
   c. $16  
   d. $17

10. Which statement is not true?
    
    a. $343 > 434$  
    b. $707 < 770$  
    c. $292 > 229$  
    d. $400 + 1 = 401$

11. $\begin{array}{c}
184 \\
- 63
\end{array}$
    
    a. 21  
    b. 111  
    c. 247  
    d. not given

12. $560 - 67$
    
    a. 627  
    b. 503  
    c. 493  
    d. 407

13. $81 + 67$
    
    a. 14  
    b. 48  
    c. 148  
    d. 158

14. $3\text{c} \times 9$
    
    a. 27  
    b. 27\text{c}  
    c. 12\text{c}  
    d. 12

15. $5 \times 5$
    
    a. 5  
    b. 10  
    c. 25  
    d. 30

16. $336 - 208$
    
    a. 128  
    b. 130  
    c. 132  
    d. 138
17. Choose the order from least to greatest.
   a. 733; 737; 773
   b. 773; 737; 733
   c. 737; 733; 773
   d. 733; 773; 737

23. Estimate by rounding to the nearest 10.
   a. 120
   b. 130
   c. 140
   d. 150

24. 2 \times 6
   a. 2
   b. 6
   c. 8
   d. 12

18. 72 + 19
   a. 101
   b. 91
   c. 87
   d. 67

25. Choose the order from greatest to least.
   a. 524; 425; 452
   b. 524; 452; 425
   c. 425; 452; 524
   d. 452; 524; 425

19. Estimate by rounding to the nearest 100.
   775
   a. 1000
   b. 900
   c. 700
   d. 600

26. 4261 - 2753
   a. 508
   b. 1408
   c. 1508
   d. 2512

20. Which number rounds to 6000?
   a. 9050
   b. 5099
   c. 5090
   d. 5909

27. 6910 + 3089
   a. 3,821
   b. 7,299
   c. 9,999
   d. 10,000

21. 0 \times 2
   a. 20
   b. 12
   c. 2
   d. 0

22. Joel has 1 ten-dollar bill, 2 one-dollar bills, 3 quarters, 1 dime, and 8 pennies. How much money does Joel have?
   a. $7.12
   b. $12.93
   c. $13.03
   d. $20.88

28. Dylan needs $.40 to buy a sticker. His 7 uncles each give him 3¢. How much more money does he need?
   a. $.30
   b. $.19
   c. $.09
   d. $.03

23. Estimate by rounding to the nearest 10.
   12
   89
   + 37
   a. 120
   b. 130
   c. 140
   d. 150

24. 2 \times 6
   a. 2
   b. 6
   c. 8
   d. 12

18. 72 + 19
   a. 101
   b. 91
   c. 87
   d. 67

25. Choose the order from greatest to least.
   a. 524; 425; 452
   b. 524; 452; 425
   c. 425; 452; 524
   d. 452; 524; 425

19. Estimate by rounding to the nearest 100.
   775
   a. 1000
   b. 900
   c. 700
   d. 600

26. 4261 - 2753
   a. 508
   b. 1408
   c. 1508
   d. 2512

20. Which number rounds to 6000?
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   a. 3,821
   b. 7,299
   c. 9,999
   d. 10,000

21. 0 \times 2
   a. 20
   b. 12
   c. 2
   d. 0

22. Joel has 1 ten-dollar bill, 2 one-dollar bills, 3 quarters, 1 dime, and 8 pennies. How much money does Joel have?
   a. $7.12
   b. $12.93
   c. $13.03
   d. $20.88

28. Dylan needs $.40 to buy a sticker. His 7 uncles each give him 3¢. How much more money does he need?
   a. $.30
   b. $.19
   c. $.09
   d. $.03

Tell About It

Explain how you solved each problem. Show all your work.

29. Jake has $40.52 in his bank. Shannon has $29.76 in her bank. How much money do they have altogether?

30. We are two factors of 4. We are the same number. What number are we?
In this chapter you will:
Explore both meanings of division
Relate multiplication and division
Learn about 0 and 1 in division
Divide numbers and cents by 2 through 5
Solve problems by writing a number sentence

Critical Thinking/Finding Together
Explain how you can arrange the orange poppies on the page in equal rows and columns with none left over. Use counters to show each model.

NATURE KNOWS ITS MATH

Divide
the year
into seasons,
four,
subtract
the snow then
add
some more
green,
a bud,
a breeze,
a whispering
behind
the trees,
and here
beneath the
rain-scrubbed
sky
orange poppies
multiply.

Joan Bransfield Graham
Understand Division

Jimmy has 15 fish. He puts 3 fish in each bowl. How many bowls does he use?

You can use repeated subtraction to find how many bowls.

Think

How many groups of 3 are in 15?
Count back by 3s until you reach 0. 12, 9, 6, 3, 0

You subtracted 5 times.

So Jimmy uses 5 bowls.

You can also divide to find how many bowls.
One meaning of division is to separate into equal groups.

You can write a division sentence to show 15 separated into equal groups of 3.

Write: \(15 \div 3 = 5\)

Read as: “Fifteen divided by three equals five.”

Separate into equal groups. Find how many groups.
Use repeated subtraction or write a division sentence.

1. 14 in all 2 in each group
2. 18 in all 6 in each group
3. 24 in all 4 in each group
4. 9 in all 3 in each group
5. 16 in all 4 in each group
6. 12 in all 3 in each group
7. 10 in all 2 in each group
8. 20 in all 5 in each group
9. 30 in all 10 in each group
Division: Sharing

Suppose Jimmy has 15 fish and 5 bowls. He puts an equal number of fish in each bowl. At most, how many fish can he put in each bowl?

Use repeated subtraction to find how many.

Think

How many 5s are in 15?
Count back by 5s.

You subtracted 3 times. So there are 3 fish in each bowl.

Divide to find how many fish in each bowl.
A second meaning of division is to share equally.

You can write a division sentence to show 15 shared equally among 5 groups.

Write: \( \frac{15}{5} = 3 \)

Read as: “Fifteen divided by five equals three.”

Divide to share. Find how many in each group.
Use repeated subtraction or write a division sentence.

10. 25 in all 5 groups
11. 12 in all 6 groups
12. 8 in all 2 groups

13. 10 in all 5 groups
14. 12 in all 4 groups
15. 14 in all 7 groups

16. How is subtraction like division? How is it different?
Here are some rules for dividing with one and zero.

- When any number is divided by 1, the answer is that number.

  
  3 counters separated into 1 equal group of 3 counters.

  
  \[ \frac{3}{1} = 3 \quad \text{or} \quad 1 \overline{)3} \]

  
  number in all  |  number of groups  |  number in each group  |  number of groups

- When any number, except 0, is divided by itself, the answer is 1.

  
  3 counters separated into 3 equal groups of 1 counter each.

  
  \[ \frac{3}{3} = 1 \quad \text{or} \quad 3 \overline{)3} \]

- When you divide 0 by any number, except 0, the answer is 0.

  
  \[ \frac{0}{3} = 0 \quad \text{or} \quad 0 \overline{)0} \]

Divide. You can use counters or draw dots to help.

1. \[ \frac{4}{1} = ? \]
2. \[ \frac{7}{7} = ? \]
3. \[ \frac{1}{0} \]
4. \[ \frac{2}{1} = ? \]
5. \[ \frac{9}{0} \]
6. \[ \frac{8}{8} = ? \]
Division Language

Here are some special words to learn.

**dividend** $\div$ **divisor** = **quotient**

\[ 3 \div 1 = 3 \quad \text{or} \quad 1 \overline{)3} \]

The dividend is the number you divide.
The divisor is the number you divide by.
The quotient is the answer.

Use counters or draw dots to find each quotient.

7. $4 \div 4 = ?$  
8. $9 \div 9 = ?$  
9. $8 \div 1 = ?$

10. $1 \div 1 = ?$  
11. $5 \div 1 = ?$  
12. $0 \div 8 = ?$

13. $0 \div 4 = ?$  
14. $2 \div 2 = ?$  
15. $0 \div 1 = ?$

16. $5\overline{)5}$  
17. $6\overline{)0}$  
18. $7\overline{)0}$

19. For each division rule on page 164, write two division sentences that can be solved using that rule.

DO YOU REMEMBER?

Multiply.

20. $3 \times 2$  
21. $7 \times 5$  
22. $8 \times 3$  
23. $4 \times 0$

24. $4 \times 4$  
25. $9 \times 2$  
26. $5 \times 1$  
27. $9 \times 5$
Ms. Smith packs 10 toy cars into boxes. She puts 2 cars in each box. How many boxes does she pack?

To find how many boxes Ms. Smith packs, divide: \(10 \div 2 = ?\).

Think:
Count back by 2s.
8, 6, 4, 2, 0

\[
\begin{array}{c}
\text{dividend} \\
10
\end{array} \div \begin{array}{c}
\text{divisor} \\
2
\end{array} = \begin{array}{c}
\text{quotient} \\
5
\end{array} \text{ or } 2)10
\]

So \(10 \div 2 = 5\) or \(2)10\).
Ms. Smith needs 5 boxes.

Write a division sentence for each model.

1. \[
8 \div 2 = ?
\]
2. \[
0 \div 2 = ?
\]
3. \[
14 \div 2 = ?
\]
4. \[
\]
5. \[
\]
6. \[
\]
Write a division sentence for each model.

7. \[ \begin{array}{c}
\text{\square \square \square} \\
\text{\square \square \square \square \square}\n\end{array} \] 
8. \[ \begin{array}{c}
\text{\square \square \square} \\
\text{\square \square \square \square \square} \n\end{array} \] 
9. \[ \begin{array}{c}
\text{\square \square \square} \\
\text{\square \square \square \square} \n\end{array} \]

Find the quotient.

10. \[ 4 \div 2 = ? \]
11. \[ 8 \div 2 = ? \]
12. \[ 10 \div 2 = ? \]
13. \[ 2 \div 2 = ? \]
14. \[ 6 \div 2 = ? \]
15. \[ 18 \div 2 = ? \]
16. \[ 12 \div 2 = ? \]
17. \[ 14 \div 2 = ? \]
18. \[ 16 \div 2 = ? \]

Copy and complete the table. Describe the pattern you see.

29. \[ \begin{array}{cccccccccc}
0 \div 2 & 2 \div 2 & 4 \div 2 & 6 \div 2 & 8 \div 2 & 10 \div 2 & 12 \div 2 & 14 \div 2 & 16 \div 2 & 18 \div 2 & 20 \div 2 \\
\end{array} \]

Problem Solving

30. Mr. James needs to pack 18 toy figures into boxes. Two animals fit in each box. How many boxes does Mr. James need?

31. Fourteen boxes were loaded on a truck by 2 workers. Each worker loaded the same number of boxes. How many boxes did each worker load?

Critical Thinking

32. Fifteen stickers are shared between 2 friends. How many stickers does each receive? Are they able to share all the stickers? Draw a picture to explain your answer.
An art class has 12 paintings. The students hang the paintings in 3 equal groups. How many paintings are in each group?

To find how many paintings are in each group, divide: \( \frac{12}{3} = ? \).

\[
\text{dividend} \div \text{divisor} = \text{quotient} \\
12 \div 3 = ? \text{ or } 3)12 \\
\text{in all groups} \quad \text{in each group} \quad \text{divisor} \\
\text{quotient} \quad \text{dividend}
\]

Think
Count back by 3s. 9, 6, 3, 0

So \( 12 \div 3 = 4 \) or \( 3)12 \).

Remember: Divide to share equally.

There are 4 paintings in each group.

Write a division sentence for each model.

1. \( \text{Practice} \)

\[
9 \div 3 = ?
\]

2.

\[
6 \div 3 = ?
\]

3.

\[
0 \div 3 = ?
\]

4.

\[
5.
\]

6.
Write a division sentence for each model.

7. 8. 9.

Find the quotient.

10. 6 ÷ 3 = ? 11. 24 ÷ 3 = ? 12. 3 ÷ 3 = ?
13. 12 ÷ 3 = ? 14. 18 ÷ 3 = ? 15. 27 ÷ 3 = ?
16. 21 ÷ 3 = ? 17. 15 ÷ 3 = ? 18. 0 ÷ 3 = ?
19. 9 ÷ 3 = ? 20. 30 ÷ 3 = ? 21. 24 ÷ 3 = ?
22. 3 | 6 23. 3 | 12 24. 3 | 0 25. 3 | 3 26. 3 | 27
27. 3 | 18 28. 3 | 24 29. 3 | 21 30. 3 | 15 31. 3 | 9

Copy and complete the table. Describe the pattern you see.

<table>
<thead>
<tr>
<th>0 ÷ 3</th>
<th>3 ÷ 3</th>
<th>6 ÷ 3</th>
<th>9 ÷ 3</th>
<th>12 ÷ 3</th>
<th>15 ÷ 3</th>
<th>18 ÷ 3</th>
<th>21 ÷ 3</th>
<th>24 ÷ 3</th>
<th>27 ÷ 3</th>
<th>30 ÷ 3</th>
</tr>
</thead>
</table>

**Problem Solving**

33. The art class needs 18 tubes of paint. The tubes come in packs of 3. How many packs does the class need?

34. Pablo draws a comic strip. The strip has 12 pictures. The pictures are in 3 rows. The same number of pictures are in each row. How many pictures are in each row?

**Critical Thinking**

35. Look at problem 34. Which words were most important in solving the problem? Why?
Dick puts 28 shells on a tray. He puts 4 shells in each row. How many rows are there?

To find how many rows,
\[ 28 \div 4 = ? \]

Think:
Count back by 4s.
24, 20, 16, 12, 8, 4, 0

So \[ 28 \div 4 = 7 \]. There are 7 rows of shells.

The 28 shells are divided into 4 equal rows. How many shells are there in each row?

To find how many in each row,
\[ 28 \div 4 = ? \]

So \[ 28 \div 4 = 7 \]. There are 7 shells in each row.

Write a division sentence for each model.

1. \[ 4 \div 4 = ? \]
2. \[ 8 \div 4 = ? \]
3. \[ 0 \div 4 = ? \]

4. \[ 6 \div 4 = ? \] 5. \[ 10 \div 4 = ? \] 6. \[ 14 \div 4 = ? \]
Find the quotient.

7. $8 \div 4 = ?$
8. $12 \div 4 = ?$
9. $40 \div 4 = ?$
10. $20 \div 4 = ?$
11. $24 \div 4 = ?$
12. $0 \div 4 = ?$
13. $28 \div 4 = ?$
14. $32 \div 4 = ?$
15. $36 \div 4 = ?$
16. $16 \div 4 = ?$
17. $4 \div 4 = ?$
18. $12 \div 4 = ?$
19. $4)\underline{8}$
20. $4)\underline{20}$
21. $4)\underline{4}$
22. $4)\underline{28}$
23. $4)\underline{32}$
24. $4)\underline{12}$
25. $4)\underline{0}$
26. $4)\underline{24}$
27. $4)\underline{16}$
28. $4)\underline{36}$

Copy and complete the table. Describe the pattern you see.

<table>
<thead>
<tr>
<th>0 ÷ 4</th>
<th>4 ÷ 4</th>
<th>8 ÷ 4</th>
<th>12 ÷ 4</th>
<th>16 ÷ 4</th>
<th>20 ÷ 4</th>
<th>24 ÷ 4</th>
<th>28 ÷ 4</th>
<th>32 ÷ 4</th>
<th>36 ÷ 4</th>
<th>40 ÷ 4</th>
</tr>
</thead>
</table>

30. Thirty-six shells were collected by 4 students. Each student collected the same number of shells. How many shells did each student collect?

31. Mary, Dan, Fay, and Bob want to share 16 cookies equally. At most, how many cookies should each child receive?

32. There are 12 children playing horseshoes. There are 4 equal teams of children. How many children are on each team?

33. If you buy 4 shirts, the store gives you another shirt for free. You buy 8 shirts. How many shirts will you take home?

Write About It

Without finding the quotients, tell which quotient will be the greatest. How do you know? Explain.

34. $6 \div 1 = ?$
35. $12 \div 2 = ?$
36. $6 \div 2 = ?$
37. $12 \div 3 = ?$
38. $6 \div 3 = ?$
39. $12 \div 4 = ?$
Divide by 5

Terry has 25 books. She puts the same number of books on each of 5 shelves. At most, how many books does she put on each shelf?

To find how many books on each shelf, divide: $25 \div 5 = ?$

Think

Count back by 5s.
20, 15, 10, 5, 0

\[
\begin{align*}
\text{dividend} & \div \text{divisor} = \text{quotient} \\
25 & \div 5 = ? \\
\text{in all groups} & \text{in each}
\end{align*}
\]

So $25 \div 5 = 5$ or $5 \left\{25\right\}$.

She puts 5 books on each shelf.

Write a division sentence for each model.

1. 2. 3.

5 \div 5 = ? \quad 10 \div 5 = ? \quad 0 \div 5 = ?

4. 5. 6.
Divide.

7. \(40 \div 5 = ?\)
8. \(30 \div 5 = ?\)
9. \(5 \div 5 = ?\)
10. \(35 \div 5 = ?\)
11. \(45 \div 5 = ?\)
12. \(25 \div 5 = ?\)
13. \(20 \div 5 = ?\)
14. \(15 \div 5 = ?\)
15. \(10 \div 5 = ?\)
16. \(0 \div 5 = ?\)
17. \(50 \div 5 = ?\)
18. \(30 \div 5 = ?\)
19. \(5)30\)
20. \(5)20\)
21. \(5)35\)
22. \(5)25\)
23. \(5)10\)
24. \(5)45\)
25. \(5)40\)
26. \(5)5\)
27. \(5)0\)
28. \(5)15\)

Copy and complete the table. Describe the pattern you see.

<table>
<thead>
<tr>
<th>(0 \div 5)</th>
<th>(5 \div 5)</th>
<th>(10 \div 5)</th>
<th>(15 \div 5)</th>
<th>(20 \div 5)</th>
<th>(25 \div 5)</th>
<th>(30 \div 5)</th>
<th>(35 \div 5)</th>
<th>(40 \div 5)</th>
<th>(45 \div 5)</th>
<th>(50 \div 5)</th>
</tr>
</thead>
</table>

**Problem Solving**

30. A book has 45 pages. Each chapter is 5 pages long. How many chapters are there in the book?

31. Marnie buys 30 wood shelves. The store ties them up in bundles of 5. How many bundles are there?

**Test Preparation**

32. There are 50 marbles. They are put into 5 bags so that the same number of marbles is in each. How many marbles would 2 bags have?

A 5 marbles  
B 10 marbles  
C 20 marbles  
D 25 marbles
Ms. Hardy has 21 tennis balls in all. There are 3 tennis balls in each can. How many cans are there?

To find how many cans, divide: \(21 \div 3 = ?\)

\[
\begin{array}{ccc}
\text{number in all} & \text{number in each group} & \text{number of groups} \\
21 & 3 & ?
\end{array}
\]

Every division fact has a related multiplication fact.

\[
\begin{array}{ccc}
\text{number in all} & \text{number in each group} & \text{number in all} \\
21 & 3 & 21
\end{array}
\]

Think \(? \times 3 = 21 \rightarrow 7 \times 3 = 21\)

So \(21 \div 3 = 7\).

There are 7 cans.

**Study this example.**

\[20 \div 5 = ?\] or \(5)20\)

Think \(? \times 5 = 20 \rightarrow 4 \times 5 = 20\)

\[20 \div 5 = 4\]

Write a multiplication fact for each.

1. \[6 \div 2 = 3\]
   \[3 \times 2 = ?\]

2. \[8 \div 4 = 2\]
   \[? \times ? = ?\]

3. \[9 \div 3 = 3\]
   \[? \times ? = ?\]
Write a multiplication sentence and a division sentence for each.

4. 

5. 

6. 

Complete each multiplication and division sentence.

7. \[9 \times 3 = \_?\] \[27 \div 3 = \_?\]

8. \[7 \times 5 = \_?\] \[35 \div 5 = \_?\]

9. \[6 \times 3 = \_?\] \[18 \div 3 = \_?\]

10. \[4 \times 2 = \_?\] \[8 \div 2 = \_?\]

11. \[6 \times 4 = \_?\] \[24 \div 4 = \_?\]

12. \[8 \times 2 = \_?\] \[16 \div 2 = \_?\]

13. \[9 \times 4 = \_?\] \[36 \div 4 = \_?\]

14. \[3 \times 5 = \_?\] \[15 \div 5 = \_?\]

15. \[\frac{2 \times 7}{2} = \_?\] \[\frac{4 \times 8}{4} = \_?\]

16. \[\frac{5 \times 9}{5} = \_?\] \[\frac{3 \times 4}{3} = \_?\]

17. \[\frac{32}{2} = \_?\] \[\frac{45}{5} = \_?\]

18. \[\frac{12}{3} = \_?\]

19. How can knowing the related multiplication fact help you complete a division sentence? Give an example.

20. There are 20 tennis players in all. Five players are on each team. How many teams are there?

21. Laura has 40 tennis balls. She puts 5 balls into each box. Are there enough tennis balls for each of 10 players to get a full box? Explain why or why not.

22. This figure is a model for the multiplication sentence \(8 \times 2 = 16\).

Which division sentence is modeled by the same figure?

A \(8 \div 2 = 4\)  B \(8 \div 4 = 2\)  C \(16 \div 2 = 8\)  D \(12 \div 2 = 6\)
Divide Cents

Daniela has 15 pennies. She gives the pennies to her 3 sisters. Each of them receives the same amount. At most, how much money will each sister get?

To find the amount of money:
- First divide.
- Then write the ¢ sign.

\[
15\text{¢} \div 3 = \frac{5\text{¢}}{3} \quad \text{or} \quad 3)15\text{¢}
\]

cents in all number of groups cents in each group

Think
\[
3 \times \ ? = 15\text{¢} \\
3 \times 5\text{¢} = 15\text{¢}
\]

Each sister will get 5¢.

Divide. Remember to write the ¢ sign.

1. \[
12\text{¢} \div 4 = ?
\]
2. \[
8\text{¢} \div 2 = ?
\]

3. \[
10\text{¢} \div 5
\]
4. \[
4\text{¢} \div 2
\]
5. \[
9\text{¢} \div 3
\]
6. \[
20\text{¢} \div 4
\]
7. \[
9\text{¢} \div 1
\]
8. \[
30\text{¢} \div 5
\]
9. \[
24\text{¢} \div 3
\]
10. \[
0\text{¢} \div 4
\]

11. \[
2)6\text{¢}
\]
12. \[
4)28\text{¢}
\]
13. \[
3)21\text{¢}
\]
14. \[
5)45\text{¢}
\]
Divide mentally.

15. 10 ÷ 2  
16. 4¢ ÷ 4  
17. 6 ÷ 3  
18. 15¢ ÷ 5  
19. 8 ÷ 1  
20. 12 ÷ 2  
21. 9 ÷ 3  
22. 8¢ ÷ 4  
23. 2)14  
24. 5)5  
25. 4)16¢  
26. 5)20¢

Multiply or divide.

27. 1 × 2  
28. 4 × 3  
29. 6 × 4  
30. 8 × 1  
31. 5 × 5  
32. 0 × 5  
33. 7 × 3¢  
34. 2 × 4¢  
35. 3 × 9  
36. 1 × 7  
37. 5¢ × 8  
38. 2¢ × 9  
39. 18 ÷ 3  
40. 28 ÷ 4  
41. 10 ÷ 5  
42. 16 ÷ 2  
43. 3 ÷ 3  
44. 35 ÷ 5  
45. 6¢ ÷ 1  
46. 36¢ ÷ 4  
47. 2)12  
48. 4)24  
49. 5)40¢  
50. 3)27¢  
51. 2)20¢  
52. 4)32  
53. 3)0  
54. 5)25

Problem Solving

55. There are 20 bikes. The same number of bikes are in each of 4 racks. At most, how many bikes are in each rack?

56. Francis rents his bike to Ann for 5 hours. Ann pays the same amount for each hour. The total bill is 35¢. How much money does Francis get for each hour?

Write About It

57. Write a problem that can be solved using the division sentence 36¢ ÷ 4 =_. Then explain how you can use coins or count back by 4s on a number line to solve it.
A function machine can help you find a pattern to solve a problem. For each number you put into the function machine, there is only one output. You can find the output by following the rule.

Here is a function machine for multiplication.

Each input number is multiplied by 4.

Think

The rule is $\times 4$.

<table>
<thead>
<tr>
<th>Rule $\times 4$</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1 \times 4$</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>$2 \times 4$</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>$3 \times 4$</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>$4 \times 4$</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>$5 \times 4$</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>$6 \times 4$</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

The pattern of the input numbers is +1.
The pattern of the output numbers is +4.

Here is a function machine for division.

Each input number is divided by 5.

Think

The rule is $\div 5$.

<table>
<thead>
<tr>
<th>Rule $\div 5$</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>$30 \div 5$</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>$25 \div 5$</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>$20 \div 5$</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>$15 \div 5$</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>$10 \div 5$</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>$5 \div 5$</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

The pattern of the input numbers is −5.
The pattern of the output numbers is −1.
Follow the rule to find the output. Explain the pattern.

1. Rule ÷ 3

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>?</td>
</tr>
<tr>
<td>27</td>
<td>?</td>
</tr>
<tr>
<td>24</td>
<td>?</td>
</tr>
<tr>
<td>21</td>
<td>?</td>
</tr>
<tr>
<td>18</td>
<td>?</td>
</tr>
<tr>
<td>15</td>
<td>?</td>
</tr>
</tbody>
</table>

2. Rule × 5

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>?</td>
</tr>
<tr>
<td>6</td>
<td>?</td>
</tr>
<tr>
<td>7</td>
<td>?</td>
</tr>
<tr>
<td>8</td>
<td>?</td>
</tr>
<tr>
<td>9</td>
<td>?</td>
</tr>
<tr>
<td>10</td>
<td>?</td>
</tr>
</tbody>
</table>

3. Rule ÷ 2

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>?</td>
</tr>
<tr>
<td>16</td>
<td>?</td>
</tr>
<tr>
<td>14</td>
<td>?</td>
</tr>
<tr>
<td>12</td>
<td>?</td>
</tr>
<tr>
<td>10</td>
<td>?</td>
</tr>
<tr>
<td>8</td>
<td>?</td>
</tr>
</tbody>
</table>

Problem Solving
Write the rule. Then solve the problem.

4. Mr. Davis carves the paws on toy animals. How many paws does he need to carve on 3 toy lions? 5 toy lions?

5. Mr. Lewis brings his lunch to work. He eats 2 sandwiches each day. How many sandwiches does he eat in 5 days?

6. Mrs. Whitecloud puts tiny lights on toy police cars. She puts 5 lights on each car. How many lights does she put on 8 cars?

7. Mrs. Smith sews 3 bells onto each toy clown. How many bells will she sew onto 5 toy clowns? 8 toy clowns?

Challenge

8. Mr. Rau attaches the legs to miniature plastic farm animals. He attaches legs to 8 plastic roosters and 7 plastic cows. How many legs does he attach?

9. Mr. Davis carves the fingers on each doll’s hands. How many fingers does he carve for 4 dolls?
Problem-Solving Strategy: Write a Number Sentence

There are 20 smiley faces in rows on the computer screen. Each row has 4 faces. How many rows of faces are there on the screen?

Read

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

Facts: 20 smiley faces in all
8 faces in each row

Question: How many rows are there?

Plan

Choose the operation to use. Decide whether to add, subtract, multiply or divide. You are separating a set into equal groups, so divide.

20 ÷ 4 = ?

Solve

There are 5 rows of smiley faces.

Check

Multiply to check. 5 × 4 = 20

or

Count the rows of faces. 5 rows of 4 = 20
Write a number sentence to solve each problem.

1. There are 6 baseball teams in the league. Each team has 2 pitchers. How many pitchers are there in the league?
   
   Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

   **Facts:** 6 teams in the league
   2 pitchers on each team

   **Question:** How many pitchers are there in the league?

   Look at the picture.
   To find the number of pitchers in all, multiply: $6 \times 2 = ?$.

2. Sixty-eight people were watching a soccer game. Twenty-nine of them were children. How many were not children?

3. The coach bought a baseball mitt, a jersey, and a batting helmet. What was the total cost?

4. The coach bought 7 boxes of baseballs. Each box held 4 baseballs. How many baseballs did the coach buy?

5. The visiting team scored 98 points. The home team scored 9 points more than the visiting team. How many points did both teams score?

6. The snack-bar manager assigned 27 workers equally over 3 workstations. How many workers did she put at each?
Solve each problem and explain the method you used.

1. Thirty students are playing a math game. The students are grouped equally on 5 teams. At most, how many students are on each team?

2. A team of 4 students had a high score of 36 points. Each student scored the same number of points. How many points did each student score?

3. Ms. Doyle has 35 students in her class. The same number of students sit in each of 5 rows. How many students sit in each row?

4. There are 4 tables in the art room. Five students are at each table. How many students are in the art room?

5. The art teacher has 18 markers. She gives an equal number of them to each of 3 students. At most, how many markers does each student get?

6. Mr. Ross gave 1 book to each of 28 students in his class. The students are arranged in 4 equal rows. How many students are in each row?

7. A box of books weighs 18 pounds. Each of the books in the box weighs 2 pounds. How many books are in the box?

8. Lenore spent 32¢ for 4 identical sheets of colored paper. How much did each sheet cost?
Choose a strategy from the list or use another strategy you know to solve each problem.

9. Mr. Ross graded 3 papers in 27 minutes. He spent the same amount of time on each paper. How much time did he take on 1 paper?

10. Two numbers have a sum of 9 and a product of 14. What are the numbers?

11. The art teacher paired off 16 students. How many pairs did she make?

12. Each morning Ms. Doyle gives stickers to the same number of students. On Monday she had 32 stickers. On Tuesday she had 28 stickers. On Wednesday she had 24 stickers. On what day will she have 16 stickers?

13. Tara buys 5 sheets of art paper for 3¢ each and 4 sheets of parchment for 5¢ each. How much does she spend in all?

14. The science class has 12 fish, 2 fish tanks, and 1 ant farm. The students put the same number of fish in each tank. How many fish are in each tank?

Use the graph for problems 15 and 16.

15. The art class used 4 jars of blue paint and 4 jars of green paint. How many jars of each color are now left?

16. Use the graph. Write a problem. Then have a classmate solve it.
Write a division sentence for each model. (See pp. 162–173, 176–177.)

Divide.

3. 8 ÷ 2  4. 6 ÷ 3  5. 16 ÷ 4  6. 10¢ ÷ 5  7. 14 ÷ 2
8. 12 ÷ 4  9. 15¢ ÷ 3  10. 18¢ ÷ 3  11. 24 ÷ 4  12. 25 ÷ 5
13. 2\(\overline{4}\)  14. 4\(\overline{8}\)  15. 5\(\overline{15}\)  16. 3\(\overline{21}¢\)  17. 4\(\overline{36}¢\)
18. 5\(\overline{20}\)  19. 4\(\overline{32}¢\)  20. 2\(\overline{2}\)  21. 4\(\overline{20}\)  22. 1\(\overline{0}\)

Complete each multiplication and division. (See pp. 174–175.)

23. 5 × 2 = ?  24. 4 × 3 = ?  25. 6 × 4 = ?  26. 6 × 5 = ?
   10 ÷ 2 = ?  12 ÷ 3 = ?  24 ÷ 4 = ?  30 ÷ 5 = ?
27. 5 \(\times 5\)  28. 4 \(\times 8\)  29. 4 \(\times 3\)  30. 3 \(\times 7\)
   5\(\overline{25}\)  4\(\overline{32}\)  4\(\overline{12}\)  3\(\overline{21}\)

Problem Solving

Choose the operation to solve.

31. The bookstore is open 7 days a week for 5 hours each day. How many hours is the bookstore open in one week?
32. Pam bought 5 of the same pens for a total of 45¢. How much did each pen cost?

(See Still More Practice, p. 462.)
Chain Operations

Multiply or divide from left to right.

\[16 \div 4 \times 2 = ?\] Think \[16 \div 4 = 4\]
\[4 \times 2 = 8\]

Add or subtract from left to right.

\[2 + 4 - 3 = ?\] Think \[2 + 4 = 6\]
\[6 - 3 = 3\]

Compute.

1. \[6 + 8 - 3\]
2. \[18 - 3 + 2\]
3. \[9 \times 2 - 3\]
4. \[7 \times 3 + 1\]
5. \[24 \div 4 \times 2\]
6. \[35 \div 5 \times 3\]
7. \[12 \div 3 + 9\]
8. \[16 \div 2 - 8\]
9. \[4 \times 5 - 9\]
10. \[8 \times 3 + 6\]
11. \[45 \div 5 - 7\]
12. \[27 \div 3 + 6\]
13. \[6 + 8 + 2 - 4\]
14. \[10 - 2 - 3 + 5\]
15. \[3 \times 3 \times 2 - 7\]
16. \[2 \times 3 \times 1 + 5\]
17. \[12 \div 3 \div 2 - 1\]
18. \[8 \div 2 \div 2 + 1\]

Compare. \[8 \times 3 \, ? \, 6 \times 5\]
\[24 \, < \, 30\]

Copy and compare. Write \(<, =, \text{ or } >\).

19. \[2 \times 5 + 8 \, ? \, 3 \times 4 - 3\]
20. \[14 \div 2 + 3 \, ? \, 16 \div 4 + 6\]

21. two plus twelve \(\, ? \,\) fifteen minus three
22. four plus zero \(\, ? \,\) ten minus five

23. three times two plus seven \(\, ? \,\) twelve divided by three plus nine
24. twenty-four divided by four minus two \(\, ? \,\) three times five minus ten
Chapter 5 Test

Divide.

1. \(9 \div 3\)  
2. \(0 \div 1\)  
3. \(16 \div 4\)  
4. \(10\:c \div 2\)  
5. \(8\:c \div 4\)  
6. \(27 \div 3\)  
7. \(18 \div 2\)  
8. \(32\:c \div 4\)  
9. \(30\:c \div 5\)  
10. \(3\:2\:4\)  
11. \(5\:4\:0\:c\)  
12. \(4\:2\:4\:c\)  
13. \(2\:1\:4\:c\)  
14. \(3\:1\:8\)  
15. \(5\:0\)  
16. \(5\:2\:5\:c\)  
17. \(2\:4\)  
18. \(5\:4\:5\)  
19. \(2\:1\:6\:c\)  
20. \(4\:4\:c\)

Complete each multiplication and division.

21. \(7 \times 4 = ?\)  
22. \(9 \times 4\:c = ?\)  
23. \(6 \times 2\:c = ?\)  
28. \(28 \div 4 = ?\)  
29. \(36\:c \div 4 = ?\)  
30. \(12\:c \div 2 = ?\)

24. \(\frac{5}{3} \times 3 = \frac{15}{5}\)  
25. \(7\:c \times 5 = \frac{35\:c}{4}\)  
26. \(\frac{5\:c}{4} \times 4 = \frac{20\:c}{1}\)

Problem Solving

Use a strategy you have learned.

27. Jill had 32 books. She put 4 books in each box. How many boxes did she use?

28. Bill bought 21 pencils. He gave each of his friends 3. How many friends received pencils?

Tell About It

Solve. Explain the rule that helped you to solve each.

29. \(0 \div 5 = ?\)

30. \(5 \div 1 = ?\)

Performance Assessment

Write a related multiplication and division sentence.

31. \(? \times ? = ?\)  
32. Explain why they are related.
# Test Preparation

Choose the best answer.

1. Choose the standard form of the number.
   \[ 9,000 + 500 + 30 + 7 \]
   - a. 9,537
   - b. 9,573
   - c. 14,037
   - d. 90,537

2. What is the amount?
   - 2 ten-dollar bills, 1 five-dollar bill, 6 nickels
   - a. $15.30
   - b. $25.30
   - c. $25.60
   - d. $30.30

3. \[ \begin{array}{c}
   4,347 \\
   + 1,686
   \end{array} \]
   - a. 5,033
   - b. 5,343
   - c. 6,033
   - d. 5,933

4. Estimate by rounding.
   \[ \begin{array}{c}
   886 \\
   - 321
   \end{array} \]
   - a. 600
   - b. 800
   - c. 900
   - d. 200

5. \[ \begin{array}{c}
   3 \\
   \times 9
   \end{array} \]
   - a. 6
   - b. 12
   - c. 27
   - d. 18

6. \[ \begin{array}{c}
   5 \\
   \times 1
   \end{array} \]
   - a. 0
   - b. 6
   - c. 1
   - d. 5

7. \[ \begin{array}{c}
   2 \frac{1}{2}
   \end{array} \]
   - a. 0
   - b. 2
   - c. 4
   - d. 1

8. \[ \begin{array}{c}
   3 \frac{7}{10}c
   \end{array} \]
   - a. 6c
   - b. 8c
   - c. 9c
   - d. 7c

9. Round to the nearest thousand.
   \[ 7091 \]
   - a. 6,000
   - b. 7,000
   - c. 7,090
   - d. 7,100

10. Estimate by rounding.
    \[ \$5.09 + \$4.51 \]
    - a. $10.00
    - b. $9.00
    - c. $11.00
    - d. $9.60

11. The quotient is 9.
    The divisor is 4.
    What is the dividend?
    - a. 13
    - b. 30
    - c. 36
    - d. 32

12. \[ \$28.20 - 19.85 \]
    - a. $8.35
    - b. $9.35
    - c. $11.65
    - d. $48.05

13. \[ 8 \times 5c \]
    - a. 12c
    - b. 32c
    - c. 40c
    - d. 13c

14. \[ 4 \overline{28} \]
    - a. 7
    - b. 14
    - c. 32
    - d. 8

15. \[ 0 \div 5 \]
    - a. 0
    - b. 1
    - c. 5
    - d. 2

16. \[ ? \div 1 = 1 \]
    - a. 0
    - b. 1
    - c. 2
    - d. not given
17. $5.07 + 3.89  
   a. $8.82  
   b. $8.86  
   c. $8.96  
   d. $9.96  

23. 351 - 282  
    a. 69  
    b. 131  
    c. 169  
    d. 633  

18. $8.00 - 6.14  
    a. $1.86  
    b. $2.14  
    c. $14.14  
    d. not given  

24. 504 + 290  
    a. 860  
    b. 870  
    c. 960  
    d. 970  

19. Choose the related fact.  
    30 ÷ 5 = 6  
    a. 30 - 5 = 25  
    b. 25 + 5 = 30  
    c. 25 ÷ 5 = 5  
    d. 6 × 5 = 30  

25. Choose the order from greatest to least.  
    a. 7125; 7512; 7251  
    b. 7125; 7251; 7512  
    c. 7512; 7125; 7251  
    d. 7512; 7251; 7125  

20. Find the missing addend.  
    17 = 9 + ?  
    a. 7  
    b. 8  
    c. 9  
    d. 26  

26. Find the missing factor.  
    ? × 2 = 16  
    a. 8  
    b. 9  
    c. 14  
    d. 18  

21. 5 × 9  
    a. 14  
    b. 40  
    c. 45  
    d. 59  

27. 68 - 39  
    a. 19  
    b. 39  
    c. 107  
    d. not given  

22. Gil’s teacher has 35 base ten blocks for her class. She has given 7 blocks to each of 4 groups of students. How many more blocks does she need to give out?  
    a. 7  
    b. 8  
    c. 9  
    d. 10  

28. Blanca gives the cashier $25. About how much does she spend if the cashier gives her $3.79 change?  
    a. about $18  
    b. about $20  
    c. about $21  
    d. about $22  

Tell About It  

Explain how you solved the problem. Show all your work.  

29. Mr. Winters found 40 marbles in a box. He gave the same number of marbles to each boy and used up all the marbles. How many boys could there be if each boy got at least 4 marbles?
In this chapter you will:
Explore multiplication of 6 through 9
Multiply three factors
Explore dividing by 6 through 9
Learn about number patterns and fact families
Solve problems by guess and test

Critical Thinking/Finding Together
A tricycle has 3 wheels. A bicycle has 2 wheels. Suppose the mice in the poem rode on bicycles. How many fewer wheels would be riding on the ice?

Nine Mice
Nine mice on tiny tricycles went riding on the ice, they rode in spite of warning signs, they rode despite advice.

The signs were right, the ice was thin, in half a trice, the mice fell in, and from their chins down to their toes, those mice entirely froze.

Nine mindless mice, who paid the price, are thawing slowly by the ice, still sitting on their tricycles . . . nine white and shiny micicles!

Jack Prelutsky
Factors and Products

This multiplication machine multiplies 4 by each factor put in it. Bob put 3 into the machine. The product, 12, came out of the machine.

\[ 3 \times 4 = 12 \] or \[ \frac{4 \times 3}{12} \]

Remember:
Factors are the numbers you multiply.
Product is the answer when you multiply.

Copy and complete each table.

1. \[ \square \times 2 \]

<table>
<thead>
<tr>
<th>IN</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

2. \[ \square \times 3 \]

<table>
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<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

3. \[ \square \times 4 \]

<table>
<thead>
<tr>
<th>IN</th>
<th>3</th>
<th>7</th>
<th>2</th>
<th>8</th>
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<th>5</th>
<th>0</th>
<th>4</th>
<th>1</th>
<th>6</th>
<th>10</th>
</tr>
</thead>
</table>

4. \[ \square \times 5 \]

<table>
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<tr>
<th>IN</th>
<th>6</th>
<th>4</th>
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<th>8</th>
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<th>9</th>
<th>0</th>
<th>1</th>
<th>3</th>
<th>10</th>
</tr>
</thead>
</table>
Multiply Sixes

Find the product of $9 \times 6$ or $\frac{6}{9}$.

You can use counters or count by 6s to find the product.

Materials: counters

Step 1
Model 9 groups of 6 counters.

- How many groups are there in all?
- How many counters are in each group?
- How many counters are there altogether?

Write an addition sentence to represent your model.

Write a multiplication sentence to represent your model.

Step 2
You can also count by 6s to find the product of $9 \times 6$.

Step 3
Repeat Steps 1–2 for these groups.

<table>
<thead>
<tr>
<th>Number of groups</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counters in each group</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Communicate

1. Look at the products for multiplying by 6.
   Describe any pattern you see.
Material: grid paper

**Step 1**
Shade 6 rows of 7 squares each.
How many rows are there in all?
How many squares are shaded in each row?
How many small squares are shaded altogether?
Write an addition sentence to represent your model.
Write a multiplication sentence to represent your model.

**Step 2**
You can also count by 7s to find the product of $6 \times 7$.

What is the product of $6 \times 7$?
How many tents did the class set up?

Mel’s class went camping. They set up 6 rows of tents with 7 tents in each row. How many tents did the class set up?

To find how many tents in all, multiply: $6 \times 7 = \text{?}$ or $\times 6$

You can use an array or count by 7s to find the product of $6 \times 7$.

An array is a number of objects arranged in rows and columns.
Repeat Steps 1–2 for these models:

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squares in each row</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

Step 3

Communicate

1. Look at the products for multiplying by 7. Describe any pattern you see.

Use counters or draw dots to show each multiplication. Complete.

2. 3 sevens = 7
   \[3 \times 7 = \_7\]
   \[3 \times 7 = \_7 \times 3\]

3. 5 sevens = 7
   \[5 \times 7 = \_7\]
   \[5 \times 7 = \_7 \times 5\]

Multiply. You may use counters or count by 7s to help.

4. \[7 \times 5\]
5. \[7 \times 2\]
6. \[7 \times 7\]
7. \[7 \times 0\]
8. \[7 \times 4\]
9. \[7 \times 8\]
10. \[7 \times 1\]
11. \[10 \times 7\]
12. \[6 \times 7\]
13. \[7 \times 6\]
14. \[5 \times 7\]
15. \[7 \times 9\]

MENTAL MATH

Study this example.

\[3 \times 2 = 6\] What do you notice about the factors?

\[6 \times 2 = 12\] What do you notice about the products?

Complete.

16. \[4 \times 2 = 8\]
17. \[2 \times 4 = 8\]
18. \[3 \times 3 = \_\]

\[8 \times 2 = \_] \[4 \times 4 = \_] \[6 \times 3 = \_]
Multiply Eights

Find the product of $9 \times 8$ or $\times 9$.

You can use connecting cubes or count by 8s to find the product.

Materials: connecting cubes

Step 1
Use your connecting cubes to model 1 group of 8 cubes.

Step 2
Now model 8 more groups of 8 cubes.

How many groups are there in all?
How many cubes are in each group?
How many cubes are there altogether?
Write an addition sentence to represent your model.
Write a multiplication sentence to represent your model.

Step 3
You can also count by 8s to show 9 groups of 8.

What is the product of $9 \times 8$?

Step 4
Repeat Steps 1–3 for these groups.

<table>
<thead>
<tr>
<th>Number of groups</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cubes in each group</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
Communicate

1. Look at the products for multiplying by 8. Describe any pattern you see.

Use counters or draw dots to show each multiplication. Complete.

2. 3 eights = ? 8
3. 5 eights = ? 8
4. 7 eights = ? 8

\[3 \times 8 = \ ? \times 3\]
\[5 \times 8 = \ ? \times 5\]
\[7 \times 8 = \ ? \times 7\]

Multiply. You may use counters or count by 8s to help.

5. 8
\[
\times 4
\]
6. 8
\[
\times 7
\]
7. 8
\[
\times 2
\]
8. 8
\[
\times 6
\]
9. 8
\[
\times 0
\]
10. 8¢
\[
\times 9
\]
11. 8
\[
\times 1
\]
12. 8¢
\[
\times 5
\]
13. 6¢
\[
\times 8
\]
14. 8
\[
\times 8
\]
15. 7¢
\[
\times 8
\]
16. 10
\[
\times 8
\]

Write <, =, or >.

17. 3 × 6 ○ 20
18. 3 × 7 ○ 7 × 2
19. 6 × 8 ○ 7 × 6

Problem Solving

20. Kim found 8 fossils. Sara found 4 times as many fossils. How many fossils did Sara find?

21. Beverly found 8 shells. Jim found 6 times as many shells. How many shells did Jim find?

22. Barbara has 5 boxes of rocks. Sue has 7 boxes of rocks. Each box has 8 rocks. How many more rocks does Sue have than Barbara?

23. Josh found 5 minerals. Walt found 2 more than Josh. Larry found 7 times as many minerals as Walt. How many minerals did Larry and Walt find?

Write About It

24. Explain how you can use doubles to find the product of 3 × 8. Can you use doubles to find the products for all the multiplication facts of 8? Explain your answer.
Multiply Nines

There are 5 rows of chairs in the school auditorium. Each row has 9 chairs. How many chairs are there in all?

To find how many chairs in all, multiply: $9 \times 5 = ?$ or $5 \times 9$.

To find the product of $5 \times 9$ use counters or count by 9s to make 5 groups of 9.

Materials: counters, one dozen egg carton, marker or crayon

**Step 1**

Number 9 of the sections on your egg carton 1–9.

**Step 2**

Put the number of counters indicated by $5 \times 9$ in each section of your egg carton.

How many groups are there in all?

How many counters are in each group?

How many counters are there altogether?

Write an addition sentence to represent your model.

Write a multiplication sentence to represent your model.

**Step 3**

You can also count by 9s to show the product of $5 \times 9$.

What is the product of $5 \times 9$?

How many chairs are there in all?
Repeat Steps 2–3 for these groups.

<table>
<thead>
<tr>
<th>Number of groups</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

Communicate

1. Look at the products for multiplying by 9. Describe any pattern you see.

Multiply. You may use counters or count by 9s to help.

2. \(9 \times 2\) 3. \(9 \times 5\) 4. \(9 \times 3\) 5. \(9 \times 7\) 6. \(9 \times 4\) 7. \(9 \times 6\)

8. \(9 \times 0\) 9. \(9 \times 9\) 10. \(6 \times 9\) 11. \(9 \times 1\) 12. \(10 \times 9\) 13. \(9 \times 8\)

Write About It

14. Make a multiplication table. Fill in all the facts to \(10 \times 9\).

<table>
<thead>
<tr>
<th>(X)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
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<tr>
<td>2</td>
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<td>3</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
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<tr>
<td>4</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

15. Draw a straight line from the product of \(9 \times 0\) to the product of \(0 \times 9\). What pattern do you see?

16. Use a blue crayon to mark all the products in the row and column for 5. What is the pattern in the ones places? the tens places?

17. Color all the even products red. What can you say about the product when both factors are odd? are even? one is odd and one is even?
Multiply Three Numbers

There are 3 pairs of tennis socks in a package. There are 3 packages in each box. How many pairs of socks are there in 2 boxes?

To find how many, multiply: $3 \times 3 \times 2 = ?$.

To multiply three factors:

- Group the first two factors using this symbol ( ).
- Multiply these factors first.
- Complete the multiplication.

or

- Group the last two factors using this symbol ( ).
- Multiply these factors first.
- Complete the multiplication.

There are 18 pairs of socks in 2 boxes.

**Associative Property of Multiplication**

Changing the grouping of the factors does not change the product.

**Multiply.** Use the grouping shown.

1. $(4 \times 2) \times 3 = ?$
   
2. $4 \times (2 \times 3) = ?$
   
3. $(2 \times 5) \times 2 = ?$
   
4. $2 \times (3 \times 2) = ?$
   
5. $(3 \times 3) \times 2 = ?$
   
6. $3 \times (3 \times 2) = ?$
   
7. $(9 \times 6) \times 1 = ?$
   
8. $9 \times (6 \times 1) = ?$
   
9. $3 \times (3 \times 3) = ?$
   
10. $(2 \times 2) \times 2 = ?$
    
11. $(1 \times 7) \times 0 = ?$
    
12. $1 \times (7 \times 0) = ?$
Find the product. Use the grouping shown.

13. \(2 \times (3 \times 3) = \ ? \times 9 = \ ?\) \(= 18\)
14. \((2 \times 2) \times 4 = \ ? \times ? = ?\)
15. \(9 \times (1 \times 8) = \ ? \times ? = ?\)
16. \(5 \times (1 \times 2) = \ ? \times \ ? = ?\)
17. \((3 \times 2) \times 4 = \ ? \times \ ? = ?\)
18. \(2 \times (4 \times 2) = \ ? \times \ ? = ?\)

Find the product. Use any grouping.

19. \(3 \times 2 \times 2 = \ ?\)
20. \(6 \times 1 \times 9 = \ ?\)
21. \(6 \times 8 \times 0 = \ ?\)
22. \(2 \times 0 \times 2 = \ ?\)
23. \(4 \times 2 \times 2 = \ ?\)
24. \(4 \times 1 \times 2 = \ ?\)

25. A tennis player gives away 4 boxes of T-shirts. Each box has 2 packages. Each package has 3 shirts. How many shirts does she give away?

26. A company buys 2 sections of seats for a tennis match. Each section has 2 rows. Each row has 4 seats. How many seats does the company buy?

DO YOU REMEMBER?

Find the missing factor.

27. \(\ ? \times 6 = 24\)
28. \(\ ? \times 8 = 24\)
29. \(\ ? \times 7 = 49\)
30. \(\ ? \times 9 = 36\)
31. \(\ ? \times 6 = 30\)
32. \(\ ? \times 8 = 40\)
33. \(7 \times \ ? = 42\)
34. \(9 \times \ ? = 45\)
35. \(6 \times \ ? = 48\)
Division Review

Tasha has 18 cassettes. She puts 3 cassettes in each group. How many groups of cassettes are there?

To find how many groups, divide: \( 18 \div 3 = ? \).

\[
\begin{align*}
18 & \div 3 = \frac{?}{?} \\
\text{in all} & \quad \text{in each group} & \quad \text{groups}
\end{align*}
\]

Remember: Divide to find how many groups or how many in each group.

Division undoes multiplication.

Every division fact has a related multiplication fact.

Think: \( 18 \div 3 = ? \)

\[
\begin{align*}
\frac{?}{?} \times 3 &= 18 \\
6 \times 3 &= 18
\end{align*}
\]

There are 6 groups of cassettes.

Study this example.

\[
\begin{align*}
0 \div 6 &= ? \\
\text{Think: } \frac{?}{?} \times 6 &= 0 \\
0 \times 6 &= 0
\end{align*}
\]

Remember: Zero divided by any number, except zero, is zero.
Divide. Use multiplication facts to help.

1. \(18 \div 2\)  
2. \(18 \div 3\)  
3. \(20 \div 4\)  
4. \(12 \div 4\)  
5. \(0 \div 5\)  
6. \(3)\overline{21}\)  
7. \(2)\overline{2}\)  
8. \(4)\overline{24}\)  
9. \(5)\overline{10}\)  
10. \(3)\overline{24}\)  
11. \(2)\overline{12}\)  
12. \(4)\overline{16}\)  
13. \(3)\overline{0}\)  
14. \(5)\overline{35}\)  
15. \(3)\overline{9}\)  
16. \(4)\overline{28}\)  
17. \(3)\overline{27}\)  
18. \(2)\overline{14}\)  
19. \(4)\overline{0}\)  
20. \(5)\overline{40}\)

**Dividing by Zero**

Remember that every division fact has a related multiplication fact.

\[6 \div 3 = 2 \quad \Rightarrow \quad 2 \times 3 = 6\]
\[6 \div 2 = 3 \quad \Rightarrow \quad 3 \times 2 = 6\]
\[6 \div 1 = 6 \quad \Rightarrow \quad 6 \times 1 = 6\]
\[6 \div 0 \text{ is impossible.} \quad \Rightarrow \quad ? \times 0 = 6\]

Think: No number works.

Remember: You cannot divide a number by zero.

Divide.

21. \(3 \div 3\)  
22. \(0 \div 4\)  
23. \(45 \div 5\)  
24. \(0 \div 5\)  
25. \(4 \div 1\)  
26. \(10 \div 2\)  
27. \(0 \div 3\)  
28. \(20 \div 5\)  
29. \(0 \div 2\)  
30. \(8 \div 4\)

**Problem Solving**

31. Nancy has a tape case that holds 32 tapes. The case has 4 sections. How many tapes does each section hold?

32. Mr. Polski wraps 45 tapes in packages. Each package holds 5 tapes. How many packages does he wrap?

33. Franco buys 2 tapes a month. How many months will it take him to buy 16 tapes?
Divide by 6

Find the quotient of $18 \div 6$ or $6)\overline{18}$

You can use counters or count back by 6s to help you divide by 6.

Materials: counters, record sheet

Step 1
Label your record sheet with these headings:

<table>
<thead>
<tr>
<th>Counters in all</th>
<th>Counters in each group</th>
<th>Number of groups</th>
<th>Division sentence</th>
<th>Multiplication sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Step 2
Model 18 counters.
How many counters do you have in all?

Step 3
Now make as many groups of 6 as you can.
How many counters are in each group?
How many groups did you make?
Write a division sentence to represent your model.
Now write a multiplication sentence to represent your model.

Step 4
Repeat Steps 2–3 for these counters:

<table>
<thead>
<tr>
<th>Counters in all</th>
<th>60</th>
<th>54</th>
<th>48</th>
<th>42</th>
<th>36</th>
<th>30</th>
<th>24</th>
<th>12</th>
<th>6</th>
<th>0</th>
</tr>
</thead>
</table>

Chapter 6
You can also count back by 6s to help you divide by 6.

**Step 5**

Count back by 6s. Start at 18 and stop at 0.

How many 6s are in 18?

Write a division sentence to show how many 6s are in 18.

---

**Communicate**

1. Look at the quotients on your record sheet. Describe any pattern you see.

2. Which meaning of division, separating or sharing, did you use to find each quotient? Explain your answer.

**Write a division sentence for each model.**

3.  [Model Image]

4.  [Model Image]

5.  [Model Image]

**Find the quotient.** Use counters or count back by 6s to help.

6.  \(24 \div 6 = ?\)

7.  \(6 \div 6 = ?\)

8.  \(36 \div 6 = ?\)

9.  \(48 \div 6 = ?\)

10.  \(12 \div 6 = ?\)

11.  \(0 \div 6 = ?\)

12.  \(18\text{¢} \div 6 = ?\)

13.  \(30\text{¢} \div 6 = ?\)

14.  \(6\overline{36}\)

15.  \(6\overline{54}\)

16.  \(6\overline{0}\)

17.  \(6\overline{42}\)

18.  \(6\overline{12}\)

19.  \(6\overline{48}\)

20.  \(6\overline{30}\)

21.  \(6\overline{18}\)

22.  \(6\overline{6}\)

23.  \(6\overline{60}\)

---

**Critical Thinking**

24. Sandy has fewer than 16 crayons. If she puts them in equal rows of 5, none are left over. If she puts them in equal rows of 6, four are left over. How many crayons are there?
Mr. Johnson plants 35 tulips. He plants 7 equal groups of tulips. At most, how many tulips are in each group?

To find how many are in each group, divide: \( \frac{35}{7} = \ ? \) or \( 7 \) \( \overline{35} \)

You can use counters or count back by 7s to help you divide by 7.

**Materials:** counters, 7 blank sheets of paper, record sheet

1. **Step 1**
   Label your record sheet with these headings:
   - Counters in all
   - Number of groups
   - Counters in each group
   - Division sentence
   - Multiplication sentence

2. **Step 2**
   Model 35 counters.
   How many counters do you have in all?

3. **Step 3**
   Place 7 blank sheets of paper on your worktable.
   What do the 7 sheets of paper stand for?

4. **Step 4**
   Now place one counter on each sheet of paper.
   Do you have enough counters to put more counters on each sheet of paper?
Continue to place counters on each sheet of paper until you can no longer give them out equally.

How many groups did you make?
How many counters are in each group?
How many tulips did Mr. Johnson plant in each group?
Write a division sentence to represent your model.
Write a multiplication sentence to represent your model.

Repeat Steps 2–5 for these counters:

| Counters in all | 70 | 63 | 56 | 49 | 42 | 28 | 21 | 14 | 7 | 0 |

You can also count back by 7s to help you divide by 7.

Count back by 7s. Start at 35 and stop at 0.

How many 7s are there in 35?
So $35 \div 7 = \underline{?}$.

1. Look at the quotients on your record sheet. Describe any pattern you see.

2. Which meaning of division, separating or sharing, did you use to find each quotient? Explain your answer.

**Find the quotient.** You may use counters or count back by 7s to help.

3. $63 \div 7 = \underline{?}$
4. $42 \div 7 = \underline{?}$
5. $21 \div 7 = \underline{?}$
6. $70 \div 7 = \underline{?}$
7. $28 \div 7 = \underline{?}$
8. $7 \div 7 = \underline{?}$
9. $35 \div 7 = \underline{?}$
10. $0 \div 7 = \underline{?}$
11. $7 \overline{56}$
12. $7 \overline{14}$
13. $7 \overline{42}$
14. $7 \overline{636}$
15. $7 \overline{496}$
Divide by 8

In the school library there are 48 chairs at tables. There are 8 chairs at each table. How many tables are there?

To find how many tables, divide: $48 \div 8 = ?$ or $8)48$

You can use counters or count back by 8s to help you divide by 8.

Materials: counters, record sheet

**Step 1**
Label your record sheet with these headings:

<table>
<thead>
<tr>
<th>Counters in all</th>
<th>Counters in each group</th>
<th>Number of groups</th>
<th>Division sentence</th>
<th>Multiplication sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Step 2**
Model 48 counters.

How many counters do you have in all?

**Step 3**
Now make as many groups of 8 as you can.

How many counters are in each group?

How many groups did you make?

How many tables are there in the library?

Write a division sentence to represent your model.

Now write a multiplication sentence to represent your model.
Step 4
Repeat Steps 2 and 3. Choose a meaning of division, separating or sharing, to model these groups.

| Counters in all | 80 | 72 | 64 | 56 | 40 | 32 | 24 | 16 | 8 | 0 |

You can also count back by 8s to help you divide by 8.

Step 5
Count back by 8s. Start at 48 and stop at 0.
How many 8s are there in 48?
So $48 \div 8 = \ ?$.

Communicate
1. Look at the quotients on your record sheet. Describe any pattern you see.

Divide. Then write the related multiplication fact.

2. $16 \div 8$  
3. $48 \div 8$  
4. $8 \div 8$  
5. $0 \div 8$  
6. $56 \div 8$

Find the quotient. You may use counters or count back by 8s.

7. $40 \div 8 = \ ?$  
8. $24 \div 8 = \ ?$  
9. $64 \div 8 = \ ?$  
10. $0 \div 8 = \ ?$

11. $56 \div 8 = \ ?$  
12. $8 \div 8 = \ ?$  
13. $72 \div 8 = \ ?$  
14. $80 \div 8 = \ ?$

15. $8 \overline{64}$  
16. $8 \overline{32}$  
17. $8 \overline{16}$  
18. $8 \overline{24}$  
19. $8 \overline{0}$

20. $8 \overline{48}$  
21. $8 \overline{8}$  
22. $8 \overline{40}$  
23. $8 \overline{56}$  
24. $8 \overline{72}$

Write $<, =, \text{ or } >$.

25. $21 \div 7 \bigcirc 2$  
26. $32 \div 8 \bigcirc 7$  
27. $48 \div 6 \bigcirc 9$  
28. $60 \div 6 \bigcirc 10$

29. $2 \bigcirc 72 \div 8$  
30. $9 \bigcirc 56 \div 7$  
31. $9 \bigcirc 54 \div 6$  
32. $7 \bigcirc 64 \div 8$
Divide by 9

Miguel buys 54 stickers. There are 9 stickers on each sheet. How many sheets does Miguel buy?

To find how many sheets, divide: \( \frac{54}{9} = ? \) or \( 9 \div 54 \)

You can use counters or count back by 9s to help you divide by 9.

Materials: counters, record sheet

**Step 1**
Label your record sheet with these headings:

<table>
<thead>
<tr>
<th>Counters in all</th>
<th>Counters in each group</th>
<th>Number of groups</th>
<th>Division sentence</th>
<th>Multiplication sentence</th>
</tr>
</thead>
</table>

**Step 2**
Model 54 counters.
How many counters do you have in all?

**Step 3**
Now make as many groups of 9 as you can.
How many counters are in each group?
How many groups did you make?
How many sheets does Miguel buy?
Write a division sentence to represent your model.
Write a multiplication sentence to represent your model.
Step 4
Repeat Steps 2 and 3. Choose a meaning of division, separating or sharing, to model these groups:

| Counters in all | 90 | 81 | 72 | 63 | 45 | 36 | 27 | 18 | 9 | 0 |

You can also count back by 9s to help you divide by 9.

Step 5
Count back by 9s. Start at 54 and stop at 0.

How many 9s are in 54?
So 54 ÷ 9 = ?.

Communicate

1. Look at the quotients on your record sheet. Describe any pattern you see.

Find the quotient. You may use counters or count back by 9s.

2. 27 ÷ 9 = ?
3. 81 ÷ 9 = ?
4. 36 ÷ 9 = ?
5. 72 ÷ 9 = ?
6. 9 ÷ 9 = ?
7. 45 ÷ 9 = ?
8. 18 ÷ 9 = ?
9. 63 ÷ 9 = ?
10. 9|36c
11. 9|90c
12. 9|18c
13. 9|27c
14. 9|45c
15. 9|0
16. 9|54
17. 9|81
18. 9|72
19. 9|9

Challenge

20. List all the division facts with 12 as the dividend. How many facts did you find? (Hint: 12 = ? × ?)

21. List all the division facts with 24 as the dividend. How many facts did you find?
What number comes next in this pattern? 27, 9, 3, __

Think: 27, 9, 3, __
\[ \div 3 \quad \div 3 \quad \div 3 \]

Rule: Start at 27. Divide by 3.

Now complete the pattern.
27, 9, 3, __
27, 9, 3, 1

Think: 3 \div 3 = 1

Study these examples.

1, 2, 4, 8, __
\[ \times 2 \quad \times 2 \quad \times 2 \quad \times 2 \]

Think: 8 \times 2 = 16

Rule: Start at 1. Multiply by 2.

2, 6, 3, 9, __
\[ \times 3 \quad -3 \quad \times 3 \quad -3 \]

Think: 9 \quad -3 = 6


1, 2, 4, 8, 16
2, 6, 3, 9, 6

Find a rule. Then complete the pattern.

1. 5, 10, 15, __
2. 1, 3, 5, 7, __
3. 45, 40, 35, 30, __
4. 16, 8, 4, __
5. 1, 3, 9, __
6. 18, 24, 30, 36, __
7. 2, 4, 3, 6, 5, __
8. 16, 8, 12, 6, 10, __
9. 2, 3, 6, 7, 14, __
10. 9, 18, 6, 12, 4, __
Copy and complete each pattern.

11. \[\begin{array}{ccccc}6 & 7 & 8 & 9 & ? \\
   \times3 & \times3 & \times3 & \times3 & \times? \\
   ? & ? & ? & ?
\end{array}\]

12. \[\begin{array}{cccc}9 & 9 & 9 & ? \\
   \times6 & \times7 & \times8 & \times?
\end{array}\]

13. \[\begin{array}{cccc}4 & 16 & 4 & 20 \\
   \div16 & \div20 & \div24 & \div?
\end{array}\]

14. \[\begin{array}{cccc}7 & 35 & 7 & 42 \\
   \div35 & \div42 & \div49 & \div?
\end{array}\]

Problem Solving

15. May 2 is on a Wednesday. What are the dates of the next four Wednesdays?

16. June 1 is on a Friday. What date is the following Monday? What are the dates of the next three Mondays?

17. August 31 is on a Thursday. What are the dates of the four Thursdays before August 31?

18. February 28 is on a Tuesday. What is the date of the Tuesday two weeks before February 28? three weeks before it?

Test Preparation

19. Here is the beginning of a pattern of tiles. Assuming that this pattern continues, how many tiles will be in the fifth figure?

A 10  B 12  C 15  D 18
Gary's teacher asked him to write two multiplication and two division facts using 3, 4, and 12. This is what Gary wrote:

Two Multiplication Facts

\[
\begin{align*}
3 \times 4 &= 12 \\
4 \times 3 &= 12
\end{align*}
\]

Two Division Facts

\[
\begin{align*}
12 \div 4 &= 3 \\
12 \div 3 &= 4
\end{align*}
\]

These sentences form a fact family for multiplication and division.

Write the fact family for each group.

1. 

2. 

3. 

4. 

5. 

6.
Copy and complete each fact family.

7. \( ? \times 3 = 30 \) \( \frac{30}{3} = ? \) \( 3 \times ? = 30 \) \( 30 \div ? = 3 \)

8. \( 5 \times ? = 50 \) \( 50 \div ? = 5 \)

9. \( ? \times 4 = 40 \) \( 40 \div 4 = ? \)

10. \( 7 \times ? = 63 \) \( 63 \div ? = 7 \) \( ? \times 7 = 63 \) \( 63 \div 7 = ? \)

11. \( ? \times 9 = 90 \) \( 90 \div 9 = ? \)

12. \( 5 \times ? = 35 \) \( 35 \div ? = 5 \)

13. \( \frac{?}{3} = 18 \) \( 18 \div 3 = ? \) \( 3 \times ? = 18 \) \( 18 \div ? = 3 \)

14. \( 7 \times ? = 14 \) \( 14 \div ? = 7 \)

15. \( ? \times 6 = 24 \) \( 24 \div 6 = ? \)

Write the complete fact family for each.

16. 2, 8, 16

17. 4, 8, 32

18. 8, 9, 72

19. 3, 9, 27

20. 5, 6, 30

21. 3, 8, 24

22. 6, 8, 48

23. 5, 9, 45

24. 6, 7, 42

25. 5, 8, 40

26. 4, 7, 28

27. 4, 9, 36

28. 3, 7, 21

29. 6, 9, 54

30. 7, 8, 56

Write the fact family for each set of numbers.

31. 3, 3, 9

32. 5, 5, 25

33. 9, 9, 81

34. How are these fact families like the ones on page 212 and above? How are they different?

35. How many facts can you write for 0, 0, 7? (Hint: you cannot divide by 0.)
Apply Facts

Use the skills and strategies you have learned to solve each problem.

1. Jose has 8 party bags. Each party bag has 6 small cars. How many cars are there in all?

2. Taryn planted 3 plants in each of 6 flower boxes. How many plants did she plant?

3. How many ways can you divide the cubes above into equal groups? Write the facts for each model.

4. Socks are on sale for $5 a pair. Mary buys 6 pairs. How much money does she spend?

5. Jo has 5 stacks of 7 pennies. Jerry has 8 stacks of 4 pennies. Who has more money? Explain.

6. Enrique baked 24 cookies for his birthday party. Each friend received 3 cookies. At most, how many friends were at the birthday party?

7. Nathan puts 7 shoe boxes in his closet. There are a pair of shoes in each box. How many shoes does Nathan have in his closet?

8. Daniel has 8 badges. Frank has 3 times as many badges. Does Frank have more or less than 30 badges? Explain.

9. Sarah spends 72 cents. She buys 9 pencils. Each pencil is the same price. How much does 1 pencil cost?

10. There were 36 songs played during a parade. Each band played 4 songs. How many bands were in the parade?

11. Robert wants to read 8 pages a day. He has three books. They have 72 pages, 56 pages, and 48 pages. How many days will it take Robert to read all the books?
Read each problem carefully before you solve it.

12. The art club has 9 members. The computer club has 3 times as many members. How many members does the computer club have?

13. A band has 54 instruments. They are on 6 shelves. Each shelf holds the same number of instruments. How many instruments are on each shelf?

14. There are 63 trees. They are planted in rows of 7. How many rows of trees are there?

15. Mandy pays a library fine of 40¢. Her book was 5 days overdue. How much did she pay for each day?

16. Nick buys 8 toy figures. Some cost 10¢ each and some cost 8¢ each. If Nick spent 74¢, how many toys did he buy at each price?

Use counters to act out each problem. Explain your thinking.

17. Jack is packing 43 books. He can fit 5 books into each box. How many boxes does he need to pack all the books?

18. Jill has 33 beads. She puts exactly 5 beads on each bracelet she makes. How many more beads does she need to finish the last bracelet?

19. Ms. Levine gets 2 bunches of grapes from each of 3 children. There are 5 grapes in each bunch. How many grapes did she get in all?
During vacations Gary and Robin collected postcards from different places. The number of postcards Gary collected is 6 times the number Robin collected. Together they have 28 postcards. How many did each child collect?

**Read**

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

**Facts:**
- Gary — 6 times the number Robin collected
- Together — 28 postcards

**Question:** How many postcards did each child collect?

**Plan**

First guess. Robin’s postcards 2

Gary’s postcards $12 \leftarrow 6 \times 2$

Then test by adding. $2 + 12 = 14$ too low

**Solve**

Guess and test again. Use a table.

<table>
<thead>
<tr>
<th>Robin’s Postcards</th>
<th>Gary’s Postcards</th>
<th>Test 28 postcards in all</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$6 \times 2 = 12$</td>
<td>$2 + 12 = 14$ too low</td>
</tr>
<tr>
<td>5</td>
<td>$6 \times 5 = 30$</td>
<td>$5 + 30 = 35$ too high</td>
</tr>
<tr>
<td>4</td>
<td>$6 \times 4 = 24$</td>
<td>$4 + 24 = 28$</td>
</tr>
</tbody>
</table>

**Check**

Robin collected 4 postcards and Gary collected 24.

Does 24 equal 6 times 4? Yes.

Does $24 + 4 = 28$? Yes.
Solve by Guess and Test.

1. Lydia spent 55¢ for a souvenir. She paid the cashier with 4 coins. What coins did she give the cashier?

   Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

   **Facts:** Souvenir costs 55¢ Pays using 4 coins.

   **Question:** What coins did Lydia give the cashier?

   **Guess.** Name 4 coins.

   **Test.** Do the coins equal 55¢?

2. The sum of two numbers is 11. Their product is 24. What are the two numbers?

3. The quotient of two numbers is 9. The sum of the same two numbers is 70. What are the two numbers?

4. Eight friends went to the lake. Some paid $4 each for tickets to the water slide. The rest paid $7 each for boat rentals. The group paid $38 in all. How many friends rented boats?

5. Sal bought some postcards. If he sends the same number to each of 6 friends, he will have none left over. If he sends the same number to each of 7 friends, he will have 3 left over. How many postcards did Sal buy?
Solve each problem and explain the method you used.

1. Sue bought 4 bunches of bananas. Each bunch had 6 bananas. How many bananas did Sue have in all?

2. Adam bought 6 packs of 9 apples. Mark bought 7 packs of 8 plums. Who bought more fruit? How much more?

3. Each silk flower costs 9¢. How much money does Judy need to buy 7 silk flowers?

4. Lee uses 8 oranges in each fruit salad. How many salads can she make with 32 oranges?

5. There are 4 rows of 2 papayas in each tray. How many papayas are in 4 trays?

6. Luis packs grapefruits in 4 packages. Each package has 2 rows of 3 grapefruits. How many grapefruits does Luis pack?

7. The fruit-of-the-month club offers 24 different kinds of fruit. The Heltz family receives 3 kinds of fruit each month. At least how many months will it take the family to get all 24 fruits?

8. Ms. Price spent $36 on four identical fruit baskets. How much did each fruit basket cost?

9. A chef uses 40 cherries to decorate 8 cakes in the same way. How many cherries does the chef use on one cake?
Choose a strategy from the list or use another strategy you know to solve each problem.

10. The fruit stand used 54 pieces of fruit to make 6 baskets. There is an equal number of fruit in each basket. How many pieces of fruit are in each basket?

11. There are 8 caramel apples in each of 4 rows on a tray. How many caramel apples are there in all?

12. Cantaloupes cost 85¢ each. Ross used 4 coins to pay for one. What coins might he have used?

13. The fruit stand sells silk flowers. Julie spent 31¢ for some daisies and violets. How many of each did she buy?

14. Mr. Lee bought a total of 10 mums and daisies. He bought more mums than daisies. He spent 84¢. How many of each did he buy?

Use the graph for problems 15–18.

15. How many McIntosh apple trees does the orchard have?

16. How many more Gala trees than Red Delicious trees are there?

17. The gardener plants a dozen more Red Delicious trees. How many trees of that kind are there now?

18. Write a problem of your own using the graph. Then solve it.
Check Your Progress
Lessons 1–16

Find the product.  
(See pp. 190–197.)

1. $7 \times 7 = ?$
2. $5 \times 8 = ?$
3. $? = 3 \times 6$
4. $? = 4 \times 8$
5. $9 \times 5$
6. $6 \times 8$
7. $9 \times 2$
8. $8 \times 9$
9. $6 \times 1$
10. $8 \times 3$
11. $0 \times 5$
12. $6 \times 7$
13. $7 \times 3$
14. $8 \times 8$
15. $9 \times 4$
16. $10 \times 5$

Multiply.  
(See pp. 198–199.)

17. $4 \times 1 \times 6 = ?$
18. $8 \times (4 \times 1) = ?$
19. $6 \times (2 \times 4) = ?$
20. $6 \times 6 \times 0 = ?$

Find the quotient.  
(See pp. 200–209.)

21. $32 \div 8$
22. $63 \div 7$
23. $45 \div 9$
24. $64 \div 8$
25. $6\overline{42}$
26. $7\overline{35}$
27. $6\overline{54}$
28. $7\overline{56}$
29. $8\overline{72}$

Write the rule. Then complete the pattern.  
(See pp. 210–211.)

30. $1, 6, 11, 16, ?$
31. $3, 6, 4, 8, 6, ?$

Write the complete fact family for each.  
(See pp. 212–213.)

32. $7, 8, 56$
33. $5, 6, 30$
34. $9, 7, 63$

Problem Solving  
(See pp. 214–219.)

35. The difference of two numbers is 3. Their product is 54. What are the two numbers?

36. Mr. Rodriguez spent $72 on 8 identical cassettes for his nieces and nephews. How much did each cassette cost?

(See Still More Practice, p. 463.)
Build Square Numbers

Study the grids below.

Each grid has the same number of squares in each row and in each column. When both factors are the same, the product is called a square number or a perfect square. So the numbers 4, 9, and 16 are square numbers.

Use grid paper to find the square numbers. Follow the pattern above.

1. $7 \times 7 = ?$
2. $6 \times 6 = ?$
3. $9 \times 9 = ?$
4. $5 \times 5 = ?$
5. $8 \times 8 = ?$
6. $10 \times 10 = ?$

Problem Solving

7. I am a number between 60 and 70. I am a square number. The difference between my digits is 2. What number am I?

8. I am a number between 40 and 50. I am a square number. The sum of my digits is 13. What number am I?
Chapter 6 Test

Find the product.
1. $9 \times 8$
2. $6 \times 6$
3. $7 \times 8$
4. $6 \times 9$
5. $9 \times 7$
6. $0 \times 8$
7. $9 \times 9$
8. $7 \times 4$
9. $8 \times 8$
10. $6 \times 1$
11. $9 \times 5$
12. $8 \times 6$
13. $10 \times 7$
14. $9 \times 4$
15. $8 \times 3$
16. $7 \times 7$
17. $4 \times (6 \times 1) = ?$
18. $3 \times 3 \times 7 = ?$

Find the quotient.
19. $48 \div 8$
20. $49 \div 7$
21. $36 \div 9$
22. $42 \div 6$
23. $7|\overline{63}$
24. $7|\overline{35}$
25. $8|\overline{56}$
26. $9|\overline{81}$
27. $8|\overline{40}$

Write the rule. Then complete the pattern.
28. $1, 8, 15, 22, ?$
29. $18, 9, 10, 5, 6, ?$

Write the complete fact family for each.
30. $9, 8, 72$
31. $6, 7, 42$
32. $6, 9, 54$

Problem Solving

Use a strategy you have learned.
33. Posters are on sale for $6 each. Chad buys 8 posters. How much money does he need?

Tell About It

Find the products. Explain the property of multiplication that you used.
34. $2 \times (3 \times 1) = ?$
   $(2 \times 3) \times 1 = ?$

Performance Assessment

35. Write and draw a model of a pair of related division and multiplication sentences.
### Test Preparation

Choose the best answer.

1. $3.26 + 6.50
   - a. $9.76
   - b. $9.86
   - c. $10.76
   - d. $10.86

2. What property of multiplication is shown by the facts below?
   
   \[ 2 \times 5 = 10 \quad \quad 5 \times 2 = 10 \]
   - a. associative
   - b. commutative
   - c. identity
   - d. not given

3. \[ \overline{5} \div 40 \]
   - a. 7
   - b. 8
   - c. 35
   - d. 45

4. \[ 703 - 511 \]
   - a. 754
   - b. 212
   - c. 202
   - d. 192

5. Round $8.07 to the nearest dollar.
   - a. $8.00
   - b. $8.10
   - c. $9.00
   - d. $10.00

6. \[ \begin{array}{c}
   2 \\
   \times 9
\end{array} \]
   - a. 7
   - b. 11
   - c. 18
   - d. 20

7. \[ 7 \times (2 \times 4) \]
   - a. 13
   - b. 42
   - c. 56
   - d. not given

8. \[ 558 + 157 \]
   - a. 401
   - b. 605
   - c. 615
   - d. 715

9. \[ 8 \overline{\div 8} \]
   - a. 0
   - b. 1
   - c. 16
   - d. 64

10. When rounded to the nearest thousand, which number does not round to 9000?
   - a. 8088
   - b. 8808
   - c. 8880
   - d. 8888

11. \[ 32 \div 4 \]
   - a. 36¢
   - b. 28
   - c. 8¢
   - d. not given

12. \[ 69 + 45 \]
   - a. 24
   - b. 104
   - c. 114
   - d. 123

13. \[ \begin{array}{c}
   5.72
   - .91
\end{array} \]
   - a. $4.81
   - b. $5.21
   - c. $5.81
   - d. $6.63

14. \[ \overline{3} \div 21 \]
   - a. 24
   - b. 18
   - c. 7
   - d. 6

15. Which fact is not part of the fact family for 7, 8, and 56?
   - a. \[ 7 \times 8 = 56 \]
   - b. \[ 56 \div 8 = 7 \]
   - c. \[ 56 - 8 = 48 \]
   - d. \[ 8 \times 7 = 56 \]

16. \[ 413 - 267 \]
   - a. 136
   - b. 146
   - c. 254
   - d. 680
17. What is the amount?

1 five-dollar bill,  
3 one-dollar bills,  
2 quarters, 1 nickel,  
7 pennies

- a. $20.67  
- b. $8.67  
- c. $8.62  
- d. $4.82

18.  $3.00  

- a. $2.28  
- b. $3.28  
- c. $3.82  
- d. not given

23. 205 + 64 + 152  

- a. 311  
- b. 411  
- c. 421  
- d. 997

19. 56  

- a. 32  
- b. 70  
- c. 76  
- d. 80

20. 14 ÷ 2  

- a. 7  
- b. 8  
- c. 12  
- d. 16

24. 24.  

- a. $2.28  
- b. $3.28  
- c. $3.82  
- d. not given

25. Which statement is true?  

- a. $3.28 > $3.62  
- b. $9.10 = 91¢  
- c. $1.07 > $1.10  
- d. $5.45 < $5.54

26. 3 × 2 × 3  

- a. 18  
- b. 15  
- c. 8  
- d. not given

27. Find the missing factor  

? × 5 = 30

- a. 5  
- b. 6  
- c. 25  
- d. 35

28. Annie picked 45 strawberries. Each of her grandchildren received 9 strawberries. At most, how many grandchildren does Annie have?  

- a. 5  
- b. 6  
- c. 7  
- d. 8

Explain how you solved each problem. Show all your work.

29. The quotient of two numbers is 8. The difference of the same two numbers is 49. What are the two numbers?  

30. Spencer wants to buy a rare stamp that costs $30.50. He has $19.75. How much more money does he need?
FIVE CENT BALLOONS

Pietro has twenty red and blue balloons on a string. They flutter and dance pulling Pietro’s arm. A nickel apiece is what they sell for.

Wishing children tag Pietro’s heels.

He sells out and goes the streets alone.

Carl Sandburg

In this chapter you will:
Collect, organize, display, and compare data on graphs
Study arrangements and combinations
Conduct probability experiments
Solve problems by using a graph

Critical Thinking/Finding Together
If you were to choose a balloon from the boy’s left hand without looking, would you have an equally likely chance of choosing a red or a blue balloon? Explain. What if you chose a balloon from his right hand?
A graph shows data, or information. Pictures or symbols are used to represent numbers in a pictograph.

Tawana made a pictograph from this tally chart, which shows the colors of her friends’ bicycles.

**Colors of Bicycles**

<table>
<thead>
<tr>
<th>Color</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>🎨 🎨 🎨 🎨 🎨</td>
</tr>
<tr>
<td>Purple</td>
<td>🎨 🎨 🎨</td>
</tr>
<tr>
<td>Silver</td>
<td>🎨 🎨 🎨 🎨</td>
</tr>
<tr>
<td>Pink</td>
<td>❇ ❇ ❇</td>
</tr>
</tbody>
</table>

If 😊 = 2 friends, then 😄 = 1 friend.

Tawana used these steps to make a pictograph.

- List each color.
- Choose a picture or symbol to represent the number of friends for each color.
- Choose a key. Let 😊 = 2 friends.
- Draw pictures to represent the total number of friends for each color.
- Label the pictograph. Write the title and the key.

How many of Tawana’s friends have pink bicycles?

To find how many, count the number of pictures for the color pink. Then use the key.

There are 1 and \( \frac{1}{2} \) pictures for the color pink.

Three of Tawana’s friends have pink bicycles.
1. Use the tally chart at the right to make a pictograph.

Problem Solving

Use your pictograph to answer each question.

2. How many stamps are represented by each symbol?

3. How many stamps does Stacy have from each country?

4. From which country does Stacy have the most stamps?

5. From which country does Stacy have the fewest stamps?

6. How many stamps does Stacy have in all?

7. How many more stamps does Stacy have from Brazil than from Canada?

8. List the countries from the one with the fewest stamps to the one with the most.

Use each tally chart to make a pictograph. Then write 3 sentences describing the information in the graph.

9. Favorite Lunches

<table>
<thead>
<tr>
<th>Lunch</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburger</td>
<td>4</td>
</tr>
<tr>
<td>Macaroni</td>
<td>1</td>
</tr>
<tr>
<td>Taco</td>
<td>2</td>
</tr>
<tr>
<td>Grilled cheese</td>
<td>3</td>
</tr>
</tbody>
</table>

10. Favorite TV Shows

<table>
<thead>
<tr>
<th>TV Show</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comedy</td>
<td>4</td>
</tr>
<tr>
<td>Sports</td>
<td>4</td>
</tr>
<tr>
<td>Nature</td>
<td>1</td>
</tr>
<tr>
<td>Quiz</td>
<td>4</td>
</tr>
</tbody>
</table>

CRITICAL THINKING

11. If you make a pictograph from the data on this tally chart and each symbol stands for 2 votes, for which colors will you need to use half symbols?

12. How many symbols will you need for each color?
Neil surveyed students in his school to find out the kinds of fruit they eat at lunch. This tally chart shows the results of his survey.

Neil used these steps to show his results on a bar graph.

- List each kind of fruit.
- Use the data from the tally chart to make an appropriate scale.
- Draw bars to represent the number of students for each fruit.
- Label the bar graph.

How many students eat apples at lunch?

To find how many, read the number on the scale at the end of the bar for apples.

The bar for apples is halfway between 14 and 16.

So 15 students eat apples at lunch.
1. Use the tally chart at the right to make a bar graph.

**Problem Solving**

Use your bar graph to answer these questions.

2. How many pencils were sold?
3. How many pens were sold?
4. Were more pencils or markers sold?
5. How many more markers were sold than folders?
6. How many more pens were sold than markers?
7. How many pens and pencils were sold?
8. How many items were sold in all?
9. Use each chart to make a bar graph. Then write 3 sentences describing the information in the graph.

**Items Sold**

<table>
<thead>
<tr>
<th>Items</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folders</td>
<td></td>
</tr>
<tr>
<td>Pencils</td>
<td></td>
</tr>
<tr>
<td>Pens</td>
<td></td>
</tr>
<tr>
<td>Markers</td>
<td></td>
</tr>
</tbody>
</table>

10. **Weekly Runs**

<table>
<thead>
<tr>
<th>Week</th>
<th>Distance Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 km</td>
</tr>
<tr>
<td>2</td>
<td>8 km</td>
</tr>
<tr>
<td>3</td>
<td>13 km</td>
</tr>
<tr>
<td>4</td>
<td>16 km</td>
</tr>
</tbody>
</table>

**DO YOU REMEMBER?**

11. List at least 2 other coin combinations that would make the same amount of change shown.
7-3

Surveys

A survey is one way to collect data by asking a question.

To conduct a survey:

► Think of a question. Give several choices in your question.

► Record how each person answers the question.

► Organize the data and display it in a tally chart.

You can make a graph from your tally chart.

Write sentences listing some facts you learned from the data you collected.

The greatest number of people surveyed chose mystery books, so mystery books is the mode.

Biographies are the least favored.

Conduct a survey.

1. Choose one of the topics at the right and write a survey question. Give three choices in your question.
2. Survey 15 students and record the data you collect in a tally chart.

3. Make a bar graph of the data in the tally chart. Use a scale of 2.

4. Write three or four sentences to describe your data.

5. Does your data have a mode? What is the mode? If your data does not have a mode, explain why it does not.

Choose another of the topics in the box and conduct a new survey.


7. Survey 15 students and record the data you collect in a tally chart.

8. Make a pictograph of the data in the tally chart. Have each symbol stand for 2.

9. Write three or four sentences to describe your data.

10. Does your data have a mode? What is the mode? If your data does not have a mode, explain why.

11. If you surveyed another 15 students using the same question as in exercise 6, what would you predict the data to be?
7-4

Circle Graphs

A **circle graph** is a way to show data as parts of a whole.

Twelve scouts voted on the badge they wanted to earn. This circle graph shows the number of votes for each type of badge.

Which type of badge did one half of the scouts vote for?

To find the badge, look for the part of the graph that is one half of the circle.

Badge B is one half of the circle graph. One half of the scouts voted for Badge B.

Check: Is 6 one half of the total number of votes?

\[
12 \div 2 = 6
\]

Yes, 6 is one half of 12.

For which badge did less than one fourth of the scouts vote?

To find the badge, look for the part of the graph that is less than one fourth of the circle.

Badge C is less than one fourth of the circle graph. Less than one fourth of the scouts voted for Badge C.

Check: Is 2 less than \(\frac{1}{4}\) of the total number of votes?

\[
12 \div 4 = 3
\]

2 is less than 3.

Yes, 2 is less than \(\frac{1}{4}\) of the total number.
Use the circle graph to complete exercises 1–4.

1. How many marbles are in Anne’s bag?

2. Which two colors of marbles make up one half of her bag?

3. Anne’s sister says that $\frac{1}{2}$ of the marbles are blue. Anne says that $\frac{1}{4}$ of the marbles are blue. Who is correct? Explain.

4. Anne has one half as many green marbles as which color marble?

Use the circle graph to complete exercises 5–9.

5. Josh’s total expense for the class trip was $24. How much did Josh spend on souvenirs?

6. Which item represents one half of Josh’s expenses?

7. Which item was three times the amount that Josh spent on food?

8. Did Josh spend more or less on admission and food than on bus? Explain how you know.

9. On which item did Josh spend one fourth of his money?

Complete these sentences about the data in the circle graph.

10. ____ make up more than half of the animals.

11. Less than $\frac{1}{4}$ of the animals are ___.
To make a line plot, follow these steps:

- Make a number line for the data.
- Draw an X above the number for each student of that age. Each X represents one student.
- Write a title for the data.

- A line plot is helpful for finding the mode and the range of a set of data.

To find the mode, look for the age or ages that have the greatest number of Xs. The data has two modes, 9 and 10.

The range is the difference between the greatest and the least data on the line plot. It tells how “spread out” the data is.

\[ 11 - 7 = 4 \quad \text{The range is 4.} \]
Use the tally chart to complete exercises 1–4.

1. Make a line plot from the data in the tally chart.

2. How many students have lived in Fanwood for 6 or 7 years?

3. What is the range for the number of years the students lived in Fanwood?

4. What is the mode for the data in the line plot? Explain.

Use the data in the chart to complete exercises 5–9.

5. Make a line plot for this data. Explain what the numbers on the line plot represent.

6. How many times did the team score more than 3 goals?

7. What is the range for the number of goals scored?

8. What is the mode for the number of goals scored?

9. About how many goals does Spartan usually score in a game? Explain your answer.

10. Is it possible for a set of data to have a mode and range that are the same number? Give an example to support your answer.

11. Is it possible for a set of data to have a range but no mode? Give an example to support your answer.
A line graph uses lines to show how data changes over time.

The Science Club recorded the outdoor temperature each day at 10 A.M. What was the temperature on Tuesday?

To find the temperature on Tuesday:
- Look for Tuesday on the horizontal axis. Look for the point above that day.
- Read across to the left to find the temperature on the vertical axis.

On Tuesday the temperature was 25° F.

A line graph shows when data increases and when it decreases.

Did the temperature increase or decrease from Monday to Tuesday?

The line between Monday and Tuesday goes down, so the temperature decreased.

Use the line graph above for questions 1–3.

1. How did the temperature change from Tuesday to Thursday? How can you tell?

2. On which day was the temperature 40°F?

3. The weather bureau reports that the temperature will decrease 10°F on Saturday. What will the temperature be?
Use the graph for exercises 4–7.

Students measured rainfall each week on Friday. They used a line graph to display the data.

4. What was the greatest number of inches of rainfall? Which week had the greatest amount?

5. Which weeks had 2 inches of rainfall?

6. Between which two weeks was there an increase in rainfall? Explain how you know.

7. Explain what happened to the rainfall between the first and second weeks.

Use the graph for exercises 8–11.

The cafeteria sells hot chocolate before school in the winter.

8. During which week did the cafeteria sell the most? How many cups of hot chocolate were sold?

9. Did sales of hot chocolate increase or decrease from the first to the third week? How can you tell?

10. How many more cups were sold during the third week than during the first week?

11. Predict which week was the coldest. Explain your reasoning.
You can analyze a set of data by finding the median and mean.

The **median** of a set of data is the middle number when the data are listed in order.

The **mean** of a set of data is the average of the data.

Jenna made this line plot to show how many books she read each week for the past 9 weeks. What are the median and mean of her data?

To find the median:

1. Write the data in order from least to greatest.
2. Find the middle number.

The median of Jenna’s data is 4.

To find the mean:

1. Find the sum of the data.
2. Divide the sum by the number of items in the set of data.

The mean of Jenna’s data is 4.
Use the table for exercises 1–2.

Lynn decided to survey her class to find how many books students read in the past month.

1. List Lynn’s data in order. Then find the median.
   1, 1, ___, ___, ___, ___, 4, 5, 5

2. Find the mean of Lynn’s data.
   
   \[
   \frac{1 + 1 + 2 + 2 + __ + __ + __ + __}{8} \]

Find the median and mean for each set of data.

3. 4.

<table>
<thead>
<tr>
<th>Number of Pets</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>1  2  3  4  5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Letters in Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>2  3  4  5  6  7  8  9</td>
</tr>
</tbody>
</table>

5. 6.

<table>
<thead>
<tr>
<th>Points Scored</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
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<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>3  4  5  6  7  8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Letters in First Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
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<tr>
<td>X</td>
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<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>3  4  5  6  7  8</td>
</tr>
</tbody>
</table>

7. Find the median.

   1, 2, 3, 4, 8, 9, 10, 11

**Hint**
If there is an even number of items in the set of data, the median is the average of the two middle numbers.
Leo and Jan each survey an equal number of students in different classes, asking how they come to school. After recording the data, Leo and Jan display their results in bar graphs.

Since all the students answered the same question, you can compare the sets of data.

How many more students come by bus in Leo’s survey than in Jan’s?

To find how many more:

- Find the bar on each graph that shows how many students come by bus.
- Compare the data for these two bars.
- Subtract to find how many more.
  \[10 - 8 = 2\]

Two more students come by bus in Leo’s survey than in Jan’s.

Use the bar graphs above to answer exercises 1–4.

1. Which way of coming to school did most students use in Leo’s survey? in Jan’s survey?

2. How many fewer students come by car in Leo’s survey than in Jan’s survey?

3. How many students were surveyed in each class?

4. Whose survey showed the greater number of students walking to school?
Use the line plots for exercises 5–6.

The line plots show the results of a survey about how many brothers and sisters the members of Clubs A and B have.

Club A  Brothers and Sisters

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Club B  Brothers and Sisters

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>X</td>
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<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5. How many more members have one brother or sister in Club B than in Club A?

6. How many members altogether have 2 or more brothers and sisters?

Use the pictographs for exercises 7–11.

The pictographs show the results of the survey question, “What after-school club is your favorite?”

<table>
<thead>
<tr>
<th>Favorite Club in Grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chorus</td>
</tr>
<tr>
<td>Chess</td>
</tr>
<tr>
<td>Crafts</td>
</tr>
<tr>
<td>Science</td>
</tr>
</tbody>
</table>

Key: Each ❤️ = 4 students.

<table>
<thead>
<tr>
<th>Favorite Club in Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chorus</td>
</tr>
<tr>
<td>Chess</td>
</tr>
<tr>
<td>Crafts</td>
</tr>
<tr>
<td>Science</td>
</tr>
</tbody>
</table>

Key: Each ❤️ = 4 students.

7. How many more 4th graders chose chess club than 3rd graders?

8. Which club did both grades choose equally?

9. How many fewer 4th graders chose crafts than 3rd graders?

10. How many students in both grades chose science?

11. How many students were surveyed in each grade?

12. Survey 10 friends. Ask, “Which sea animal is your favorite: dolphin, whale, or seal?”
Compare your data with a classmate and write a summary of your comparison.
Arrangements and Combinations

Mark and Varel have a set of 4 geometric shapes: a circle, a triangle, a rectangle, and a square.

How many ways can they arrange the 4 shapes in a line so that the rectangle and triangle are not side by side?

To find how many ways, make an organized list of the possible arrangements.

An organized list can help you see if all possibilities have been tried and that no solution is repeated.

Here is part of the list they made.

<table>
<thead>
<tr>
<th>Line</th>
<th>Shapes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>circle</td>
</tr>
<tr>
<td>2</td>
<td>circle</td>
</tr>
<tr>
<td>3</td>
<td>triangle</td>
</tr>
<tr>
<td>4</td>
<td>triangle</td>
</tr>
<tr>
<td>5</td>
<td>triangle</td>
</tr>
<tr>
<td>6</td>
<td>triangle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>triangle</th>
<th>square</th>
<th>rectangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Problem Solving

Make an organized list of arrangements.

1. Complete the list above. How many ways can Mark and Varel arrange the shapes?
2. How many ways can you arrange in a line a circle, a rectangle, and 2 different-sized squares if the squares are not side by side?
Make an organized list of arrangements for each.

3. How many ways can you arrange in a line a red square, a green triangle, a red circle, and a green rectangle if the shapes of the same color are not side by side?

4. How many ways can you arrange in a line a circle, a square, a rectangle, and 2 triangles if you always begin with the triangles?

Tree Diagrams

Nicky has a red, a yellow, and a green sweatshirt. He also has a pair of blue and a pair of black jeans. How many different outfits can Nicky make?

To find how many outfits, make an organized list or a tree diagram.

A tree diagram shows different combinations.

**Tree Diagram**

<table>
<thead>
<tr>
<th>Blue jeans</th>
<th>Red sweatshirt</th>
<th>Yellow sweatshirt</th>
<th>Green sweatshirt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black jeans</td>
<td>Red sweatshirt</td>
<td>Yellow sweatshirt</td>
<td>Green sweatshirt</td>
</tr>
</tbody>
</table>

Nicky can make 6 different outfits.

Make an organized list and a tree diagram for each.

5. Catherine has a brown, a plaid, and a black skirt. She also has a white, a red, and a tan sweater. How many different outfits can Catherine make?

6. Dean makes a sandwich with 1 slice of meat and 1 slice of cheese. He has ham, bologna, and turkey. He also has white and yellow cheese. How many different sandwiches can he make?
7-10

Probability Experiments: Events and Outcomes

Probability is the chance that an event, or situation, will happen.

An outcome is a possible result of an experiment.

An event is equally likely to happen if each outcome has an equal chance of happening. The spinner is equally likely to land on 1, 2, 3, or 4.

An event is impossible if it cannot happen. It is impossible to spin a 7.

An event is possible if it might happen. It is possible to spin 1, 2, 3, or 4.

An event is certain if it is definitely going to happen. The spinner is certain to land on a number less than 5.

An event is more likely if it has a greater chance of happening. The spinner is more likely to land on a number less than 4 than the number 4.

An event is less likely if it has a greater chance of not happening. An event is less likely to land on a number greater than 3 than a number less than 3.

The probability is \( \frac{3}{4} \) out of 4. The probability is \( \frac{1}{4} \) out of 4.

Outcomes: 1, 2, 3, 4
Use the cube for exercises 1–5.

Tina rolled a 1–6 number cube.

1. List the possible outcomes.

2. Are the outcomes equally likely? Explain why.

3. Is it certain, possible, or impossible to roll a 3?

4. Is Tina more likely or less likely to roll a number less than 5? Explain.

5. Tina predicted that she would be less likely to roll a number greater than 5. Explain whether her prediction is correct.

List the possible outcomes for each spinner below. Tell whether each outcome is equally likely, more likely, or less likely to happen.

6.  

7.  

8.  

9. Find the probability of landing on green for each spinner above.

TEST PREPARATION

10. Is it certain, possible, or impossible to pick any two one-digit numbers and have the sum be 15?

   A certain     B possible     C impossible
Third graders worked on probability experiments for a math fair. They made graphs to display their results.

Tori wanted to test whether heads or tails would be equally likely outcomes when tossing a coin. She tallied her results. She made a bar graph to show her data. What conclusion could Tori draw?

Tori concluded that the experiment showed that there was an equally likely chance of getting heads or tails.

Carlos made 6 cards and wrote the number 1, 2, or 3 on each. He put the cards in a box and, without looking, picked two cards at a time. He added the numbers he picked and tallied the sums.

Use the data from Carlos’s experiment for questions 1 and 2.

Carlos made 6 cards and wrote the number 1, 2, or 3 on each. He put the cards in a box and, without looking, picked two cards at a time. He added the numbers he picked and tallied the sums.

1. Make a line plot to display Carlos’s results.
2. Write a conclusion about which sums you are less likely to pick numbers for than others.
Use Ryan’s data for questions 3–4.

Ryan made 10 cards, each with a colored star. Six stars were blue, 3 stars were red, and 1 star was gold. He asked friends to pick a card from a box without looking. The card was replaced each time.

3. Make a bar graph to display Ryan’s data.

4. Write a conclusion about which color you are more likely to pick than any other color. Explain your conclusion.

Use Lisa’s data for questions 5–7.

Lisa made this spinner for her experiment.

5. How many times did Lisa spin the spinner?

6. Use her data to make a bar graph. Write a conclusion.

7. Lisa decides to make another spinner. She changes 1 red section to yellow. She repeats her experiment. Tell the likely tally of the outcomes and explain why.

Write About It

8. Plan an experiment like those in this lesson. Conduct the experiment and tally your results. Show your results in a line plot and a bar graph. Write a conclusion.
When collecting data, you can make a **prediction**, an educated guess about what will happen, based on the results of data.

> You can make a prediction from a graph.

The science teacher recorded the daily high temperature for 3 weeks. She asked the class to predict whether the next day’s temperature was more likely to be in the 60s or in the 70s.

- To predict from a line plot, look where the Xs lie.
- Since more Xs are in the 70s, you can predict that the next day’s high temperature is likely to be in the 70s.

> You can make a prediction from a probability experiment.

If you were to pick a colored tile from the bag shown here, predict what color you are more likely to pick than any other color.

- To predict from a probability experiment, find the probability for each possible outcome.
- Since there are more red tiles than all the other colors combined, you can predict that you are more likely to pick red than any other color.
Use the game to answer exercises 1–3.

Jen and Emily use 8 cards in a game. Three cards have a red star and 5 have a gold star. Jen gets 10 points for each red star picked and Emily gets 10 points for each gold.

1. What is the probability of picking a red star?

2. Predict who will win the game. Explain why.

3. Is this game fair? Explain why or why not.

Use the graph to answer exercises 4–5.

A box has colored cubes in it. A cube is picked and then replaced 20 times. The results are graphed.

4. Of which color cubes do you think there are more? Explain.

5. If you were to pick a cube from the box, what color do you think you are less likely to pick than any other color?

Use the graph to answer exercises 6–7.

The science class made a graph to show the insects they saw on a nature walk.

6. Fewer of which kind of insect was seen than any other kind?

7. Predict which kind of insect another class might see more of than other kinds if that class took the same nature walk. Explain.
Joe made a pictograph to display the number of coins from each country in his coin collection. How many coins does Joe have?

**Facts:**
- coins from Brazil, Jamaica, Germany, Canada, and Ireland
- Each symbol stands for 4 coins.

**Question:** How many coins does Joe have?

**Plan:**
First count on to find the number of coins from each country. Then add to find the total number of coins.

**Solve:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Coins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>3 □ = 12</td>
</tr>
<tr>
<td>Canada</td>
<td>4 □ = 16</td>
</tr>
<tr>
<td>Germany</td>
<td>2 □ = 8</td>
</tr>
<tr>
<td>Ireland</td>
<td>4 □ = 16</td>
</tr>
<tr>
<td>Jamaica</td>
<td>4 □ and 1 ¶ = 18</td>
</tr>
</tbody>
</table>

Joe has 70 coins from different countries.

**Check:**
Count on by 4s and by 2s to total the number of coins on the graph.
Use the graph to solve each problem.

1. This bar graph shows the results of a survey of the states visited by students during their vacations. What states had more than 15 visiting students?

Reread the problem. Focus on the facts and the question. Look at the graph.

Facts: Shown on the bar graph

Question: What states had more than 15 visiting students?

Plan

List the states that had more than 15 student visitors.

2. Use this pictograph. How many more citizens prefer summer than winter? What seasons are enjoyed by fewer than 50 citizens?

3. Use the key symbol to increase the number of citizens who prefer autumn by 15.

4. Research information on the various colors used in state flags. Organize your data in a tally chart, then make a pictograph or a bar graph to show your results. Compare your data with that of your classmates.

<table>
<thead>
<tr>
<th>Favorite Seasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Season</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Spring</td>
</tr>
<tr>
<td>Summer</td>
</tr>
<tr>
<td>Autumn</td>
</tr>
<tr>
<td>Winter</td>
</tr>
</tbody>
</table>

Key: Each x = 10 citizens. Each / = 5 citizens.
Solve each problem and explain the method you used. Use the bar graph for problems 1–4.

1. What types of travel did the following numbers of students like?
   a. 40 students
   b. 45 students
   c. 15 students
   d. *about* 30 students

2. What types of travel did more than 30 students like?

3. What type of travel is liked by the least number surveyed?

4. How many more students liked the bicycle than the helicopter?

Use the pictograph for problems 5–10.

5. In what two months were the same number of cards sold?

6. How many cards were sold in all in November and December?

7. In what month was the greatest number of cards sold?

8. In what months were between 200 and 500 cards sold?

9. The number of cards sold in May was double the number sold in April. How many cards were sold in May?

10. The store sold about 450 cards in June. What key symbols would be used on the pictograph for 450 cards?
Choose a strategy from the list or use another strategy you know to solve each problem.

11. Margo makes 3 posters with 8 stars on each poster. Then she makes 4 posters with 5 stars on each. How many stars does she use in all?

12. From which bag is Terri more likely to pull a red marble?

13. From which bag is Terri less likely to pull a blue marble?

14. From which bag does Terri have an equally likely chance of pulling a red or a blue marble?

Use the bar graph for problems 15–18.

15. How many more students liked black rather than white sneakers?

16. What sneaker color(s) were liked by between 16 and 22 students?

17. How many students were surveyed for their favorite sneaker color?

18. What sneaker color was preferred by 2 more than twice the number that preferred white?

19. Use the data from the tally chart to make a graph. Then write a problem for a classmate to solve.
1. Beverly has a black and a white T-shirt. She also has a pair of navy and a pair of gray sweatpants. Make an organized list or tree diagram to find how many different outfits Beverly can make.

2. Use the spinner. Which has a greater chance of occurring, an odd number or an even number? Explain your answer. What is the probability of landing on an odd number?

3. Make a pictograph of the data in the tally chart at the right. Make the symbol represent 2 wins.

Use your pictograph to answer problems 4 and 5.

4. How many games did the Blue team win?

5. Discuss the range, median, and mode of the data.

6. Make a bar graph of the data in the tally chart at the right. Use a scale of 2.

Use your bar graph to answer problems 7 and 8.

7. Which bar on your graph is the shortest? Why?

8. How many TVs were repaired altogether?
Relate Probability to Fractions

The probability of an event can be written in words or as a fraction.

To find the probability of landing on green, count the number of green sections and the total number of equal sections on the spinner.

The probability of landing on green is 1 out of 8.

This can also be written as the fraction.

\[
\frac{1}{8} \rightarrow \text{number of green outcomes} \\
\frac{8}{8} \rightarrow \text{total possible outcomes}
\]

The probability of landing on red is 2 out of 8 or \( \frac{2}{8} \).

Use the spinner to complete exercises 1–4. Write the probability in two ways.

1. What is the probability of landing on a circle?
2. What is the probability of landing on a triangle?
3. What is the probability of landing on a square?
4. What is the probability of landing on a pentagon?

Use color cubes to complete exercises 5–7. Write the probability in two ways.

5. What is the probability of picking red?
6. What is the probability of picking blue?
7. What is the probability of picking orange?
8. Create your own probability experiment and write the probabilities of each outcome as a fraction.
Chapter 7 Test

1. Suppose you spin the spinner twice. List all the different color combinations you can get.

2. Find the probability of landing on red.

Use the bar graphs to answer exercises 3–5.

3. How many fewer fourth graders than third graders prefer soccer?

4. Which grade has more students who like baseball?

Problem Solving

Use a strategy you have learned.

5. How many students were surveyed in both grades in the bar graphs above?

Tell About It

Explain your answer.

6. In the spinner above, does each color have an equally likely chance of occurring?

Performance Assessment

7. Use the tally chart to make a line plot.

8. Write 2 sentences describing the data from your line plot. Include range, mode, and median.

<table>
<thead>
<tr>
<th>Students’ Ages</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>H</td>
</tr>
<tr>
<td>6</td>
<td>HHHH</td>
</tr>
<tr>
<td>7</td>
<td>HHH</td>
</tr>
<tr>
<td>8</td>
<td>HHHH</td>
</tr>
</tbody>
</table>
**Test Preparation**

Choose the best answer.

1. $\begin{array}{ll}
   7 & \text{a. 15} \\
   \times 8 & \text{b. 49} \\
   \end{array}$

2. $\begin{array}{ll}
   \$4.38 & \text{a. } \$4.23 \\
   +.95 & \text{b. } \$5.33 \\
   \end{array}$

3. $561 - 294$

4. The rule for a function is divide by 6. If the input is 30, what is the output?

5. Round 1729 to the nearest hundred.

6. If you were to spin the spinner, which outcome is certain?

7. $3 \times 5 = \_ \times 3$

8. Which fact is part of the fact family for 6, 9, and 54?

9. $4 \times 8$

10. $3258 - 1046$

11. $\$62.17 + 17.99$

12. How many more blue cars were washed than yellow and black cars?

**Cars Washed**

- Blue: 5
- Purple: 8
- Yellow: 15

- a. 2
- b. 5
- c. 8
- d. 13
13. $3|21$
   a. 7  b. 9  c. 18  d. 24
17. $70.87 - 24.88$
   a. $35.09  b. $45.99  c. $54.01  d. not given

14. What property of multiplication is shown below?
   $4 \times (2 \times 3) = (4 \times 2) \times 3$
   a. associative  b. commutative  c. identity  d. not given
18. $8|64c$
   a. 6c  b. 7c  c. 8c  d. 9c

15. What is the range of the data?
   a. 4  b. 5  c. 6  d. 10
19. How many cars were washed on Thursday?
   a. 15  b. 20  c. 25  d. 30

16. Jana has 8 boxes of chocolates. There are 3 chocolates in each box. How many chocolates does she have in all?
   a. 8  b. 11  c. 22  d. 24
20. Emily and 3 friends share 28 peanuts equally. How many peanuts does each person receive?
   a. 7  b. 8  c. 9  d. 10

Tell About It

Explain how you solved each problem. Show all your work.

21. Find the median and the mean for the data in the line plot in question 15.
22. Use the line graph in question 19 to predict whether more than or fewer than 25 cars might be washed on Sunday.
Little Pine

My little pine tree is just a few feet tall. It doesn’t even have a trunk yet. I keep measuring myself against it. But the more I watch it the slower it grows.

Wang Jian

In this chapter you will:
- Estimate and measure in customary and metric units
- Read Fahrenheit and Celsius scales
- Relate map distances to actual distances
- Learn about time to the minute, elapsed time, and calendars
- Solve problems by making tables

Critical Thinking/Finding Together
The tallest fully grown pine tree is 367 feet tall. Do you think a pine tree grows faster or slower than you? Explain your reasoning.
the quarter inch, half inch, and inch (in.) are customary units used to measure length.

Look at the markings on the ruler.

- inch (1 in.): longest marks — 1, 2, 3, and so on
- half inch (½ in.): there are 2 half inches in every inch
- quarter inch (¼ in.): there are 4 quarter inches in every inch

Some measures are not exact. These measures are given to the nearest unit.

- The crayon is about $3\frac{1}{2}$ in. long.
- The eraser is about $1\frac{1}{4}$ in. long.

Remember: Align the object with the beginning of the ruler.

Read $3\frac{1}{2}$ as “three and one-half.”

Read $1\frac{1}{4}$ as “one and one-fourth.”

Materials: inch ruler, record sheet

Step 1 Label the columns of your record sheet with these headings: Object, Nearest Quarter Inch, Nearest Half Inch, Nearest Inch.
Choose five objects from your classroom to measure to the nearest quarter inch, half inch, and inch.

Write the names of these objects on your record sheet.

Align the end of one of the objects with the beginning of the ruler.

Look at the other end of the object.

Record the length of the object to the nearest quarter inch.
Record the length of the object to the nearest half inch.
Record the length of the object to the nearest inch.

Repeat Steps 3 and 4 for the remainder of the objects listed on your record sheet.

Communicate

1. When measuring an object to the nearest inch, how do you decide which is the correct measurement?
2. List the steps a classmate should use to measure an object's length to the nearest quarter inch.
3. How many $\frac{1}{2}$ in. units are between $1\frac{1}{2}$ in. and 3 in. on a ruler? How many $\frac{1}{4}$ in. units?

Draw a line for each length.

4. 3 in. 5. 7 in. 6. $3\frac{3}{4}$ in. 7. $6\frac{1}{2}$ in.
8. $8\frac{1}{4}$ in. 9. $10\frac{1}{4}$ in. 10. $4\frac{3}{4}$ in. 11. $12\frac{1}{2}$ in.

Write About It

12. Explain how you used your ruler to draw the line in exercise 11.
The foot (ft) and yard (yd) are also customary units used to measure length.

- The width of your hands spread is about 1 foot.
  - 1 foot = 12 inches
  - 1 ft = 12 in.

- The distance from the tip of your nose to your fingertip is about 1 yard.
  - 1 yard = 36 inches
  - 36 in. = 3 ft
  - So 1 yd = 3 ft

The foot and the yard are used to measure large objects.

Study these examples.

Which unit is used to measure each: in., ft, or yd?

1. width of a book
2. height of a person
3. length of a crayon
4. length of a soccer field
Choose the letter of the best estimate.
5. height of a glass a. 8 in. b. 80 in. c. 8 yd
6. length of a football field a. 10 ft b. 100 ft c. 100 yd
7. length of a truck a. 5 ft b. 20 ft c. 20 yd

Copy and complete the table.

| inches | 12 | 24 | ? | ? | 60 | ? |
| feet   | 1  | 2  | ? | 4 | ?  | ? |
| yards  | 1  | 1  | ? |   | ?  |   |

Compare. Write <, =, or >.
12. 2 ft ? 1 yd 13. 6 ft ? 72 in. 14. 2 yd ? 5 ft
15. 2 yd ? 74 in. 16. 30 in. ? 1 yd 17. 108 in. ? 3 yd

Order the measures from longest to shortest.
18. 4 ft, 2 yd, 15 in. 19. 3 yd, 60 in., 10 ft

Order the measures from shortest to longest.
20. 5 ft, 2 yd, 24 in. 21. 4 yd, 72 in., 5 ft

Use a yardstick or tape measure to find each length.

<table>
<thead>
<tr>
<th>Nearest foot</th>
<th>Nearest yard</th>
</tr>
</thead>
<tbody>
<tr>
<td>length of your desk</td>
<td>?</td>
</tr>
<tr>
<td>length of the board</td>
<td>?</td>
</tr>
<tr>
<td>length of the classroom</td>
<td>?</td>
</tr>
</tbody>
</table>
The **mile** (**mi**) is a customary unit used to measure distance.

A mile is *about* how far you can walk in 25 minutes.

\[
1 \text{ mi} = 5280 \text{ ft} \\
1 \text{ mi} = 1760 \text{ yd}
\]

**Which unit is used to measure each:** in., ft, yd, or mi?

1. distance across town
2. length of a room
3. width of a quarter
4. distance to the Moon

**Choose the letter of the best estimate.**

5. length of a kite's string
   a. 30 in.     b. 30 yd    c. 30 mi

6. length of a river
   a. 400 ft     b. 1 mi     c. 400 mi

7. distance from New York to Florida
   a. 1200 ft    b. 50 mi    c. 1200 mi

**Compare. Write <, =, or >.**

8. 600 yd  ?  1 mi
9. 2 mi  ?  2000 yd
10. 5280 ft  ?  2 mi

11. 1 mi  ?  3000 ft
12. 1000 yd  ?  1000 ft
13. 1760 ft  ?  5280 yd

14. Explain the method you used to compare measurements in exercises 8–13.

**Complete. Write feet, yards, or miles.**

15. The length of the school bus is about 40  ?  long.

16. Tommy walked about 4  ?  in 2 hours.
17. The distance from Bluebay to Little Town is 103 miles. The distance from Little Town to Finwood is 228 miles. About how far is Bluebay from Finwood?

**Hint**
Estimate the distances by rounding.

Map Distance
Bryan drew a map of his neighborhood. He wanted to show how far he lives from the park.

Measure the map distance.

The distance on the map from Bryan’s house to the park is 2 inches.

Use the scale to find the actual distance.

2 in. = 1 in. + 1 in.
2 in. = 1 mi + 1 mi
2 in. = 2 mi
The actual distance from Bryan’s house to the park is 2 miles.

Problem Solving
18. What is the map distance between Bryan’s house and the library?

19. What is the actual distance between Bryan’s house and the library?

20. What is the actual distance between the library and the store?

Critical Thinking
21. How would each actual distance change if the scale is 1 in. = 2 mi?
8-4

Customary Units of Capacity

The cup, pint, quart, half gallon, and gallon (gal) are customary units used to measure liquids.

Remember: 1 pt = 2 c
1 qt = 2 pt

1 half gallon = 2 qt = 1 gal

Which unit is used to measure each: c, pt, qt, or gal?

1. milk in a small glass
2. water in a bathtub
3. water in a large vase
4. juice in a small container

Choose the letter of the best estimate.

5. a. 2 c  
   b. 1 qt  
   c. 1 half gallon

6. a. 10 pt  
   b. 10 qt  
   c. 10 gal
Complete.

7. If 1 pt = 2 c, then
   a. 2 pt = $\frac{4}{2}$ c
   b. 3 pt = $\frac{6}{3}$ c
   c. 8 pt = $\frac{16}{8}$ c

Think: 2 pt = 1 pt + 1 pt

8. If 1 qt = 2 pt, then
   a. 2 qt = $\frac{4}{2}$ pt
   b. 3 qt = $\frac{6}{3}$ pt
   c. 6 qt = $\frac{12}{6}$ pt

9. If 1 half gallon = 2 qt, then
   a. 2 half gallons = $\frac{4}{2}$ qt
   b. 3 half gallons = $\frac{6}{3}$ qt
   c. 4 half gallons = $\frac{8}{4}$ qt

10. If 1 gal = 4 qt, then
    a. 3 gal = $\frac{12}{3}$ qt
    b. 4 gal = $\frac{16}{4}$ qt
    c. 5 gal = $\frac{20}{5}$ qt

Compare. Write <, =, or >.

11. 3 c ? 1 pt
12. 2 pt ? 5 c
13. 2 pt ? 2 qt
14. 2 qt ? 4 pt
15. 3 qt ? 3 gal
16. 1 gal ? 3 qt
17. 1 half gallon ? 3 qt
18. 5 qt ? 2 half gallons
19. 4 c ? 1 qt
20. 2 qt ? 5 c

Problem Solving

21. Carolyn is making 4 milk shakes. She needs 2 c of milk for each. How many pints of milk does Carolyn need?

22. Joyce used 1 gal of apple juice for punch. She used 2 qt of orange juice. How much more apple juice than orange juice did she use?

23. Tony fills his 2-gal fish tank with water. He uses a container that holds 1 qt of water. How many times does Tony fill the container?
Chapter 8

8-5

Ounce, Pound

The **ounce (oz)** and **pound (lb)** are customary units used to measure weight.

- The ounce can be used to weigh small objects.
  
  A slice of bread can be used as a benchmark for 1 ounce (1 oz). A slice of bread weighs *about* 1 ounce.

- The pound can be used to weigh large objects.
  
  A loaf of bread can be used as a benchmark for 1 pound (1 lb). A loaf of bread weighs *about* 1 pound.

1 lb = 16 oz

---

Which unit is used to measure each: oz or lb?

1. feather  
2. chicken  
3. pen  
4. television  
5. table-tennis ball  
6. toaster

Choose the letter of the best estimate.

7. stick of butter  
   a. 4 oz  
   b. 4 lb  
   c. 8 oz

8. apple  
   a. 5 oz  
   b. 5 lb  
   c. 20 oz

9. dog  
   a. 50 oz  
   b. 5 lb  
   c. 50 lb

10. bag of potatoes  
    a. 10 oz  
    b. 1 lb  
    c. 10 lb
Copy and complete the table. Describe any pattern you see.

<table>
<thead>
<tr>
<th>ounces</th>
<th>16</th>
<th>32</th>
<th>48</th>
<th>64</th>
<th>?</th>
<th>96</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>pounds</td>
<td>1</td>
<td>2</td>
<td>?</td>
<td>?</td>
<td>5</td>
<td>?</td>
<td>7</td>
</tr>
</tbody>
</table>

Think:
1 lb = 16 oz
2 lb = 16 oz + 16 oz
2 lb = 32 oz

Compare. Write <, =, or >.

12. 3 lb ? 64 oz
13. 16 oz ? 2 lb
14. 15 oz ? 1 lb
15. 2 lb ? 33 oz
16. 96 oz ? 6 lb
17. 6 lb ? 80 oz
18. 5 lb ? 76 oz
19. 108 oz ? 7 lb
20. 111 oz ? 6 lb
21. 19 oz ? 2 lb
22. 4 lb ? 70 oz
23. 3 lb ? 45 oz

Problem Solving


25. Mike uses 8 oz of cheese for a cake. How many pounds of cheese does he need for 2 cakes?

26. Matt used 3 lb of bananas for 3 cakes. How many ounces is this?

Challenge

27. If an object weighs 30 oz, it is about ? lb.

28. If an object weighs 46 oz, it is about ? lb.
The centimeter (cm) and decimeter (dm) are metric units used to measure length.

A crayon is about 1 decimeter (1 dm) long.

You can use a crayon as a benchmark for 1 dm.

Which unit is used to measure each: cm or dm?

1. length of an eraser
2. length of a book
3. width of a cassette tape
4. length of a calculator

Choose the letter of the best estimate.

5. length of a mosquito
   a. 1 cm  b. 1 dm  c. 3 cm

6. length of a garden snake
   a. 3 cm  b. 3 dm  c. 1 cm

7. length of a paper clip
   a. 3 cm  b. 8 cm  c. 1 dm

8. length of a cassette tape
   a. 4 cm  b. 4 dm  c. 1 dm
Copy and complete the table. Describe any pattern you see.

9. | centimeters | 10 | 20 | ? | 40 | 50 | ? | 70 |
   | decimeters | 1  | 2  | 3  | ?  | ?  | 6  | ?  |

Compare. Write <, =, or >.

10. 4 dm ? 43 cm  
11. 18 cm ? 1 dm  
12. 30 cm ? 3 dm  
13. 45 cm ? 5 dm  
14. 4 dm ? 40 cm  
15. 38 cm ? 4 dm

Without using a ruler, draw a line segment for each given length. Then measure to find the actual length.

16. 1 cm  
17. 5 cm  
18. 1 dm  
19. 3 dm

CHALLENGE

Did you know your heart is about the same size as your fist? Your heart and fist grow at about the same rate.

Work with a partner.

20. Cut a piece of string about 50 centimeters long. Use your string and a centimeter ruler to measure:
   a. the width of your fist.
   b. the length of your fist.
   c. the distance around your fist.
   d. the width, length, and distance around an adult’s fist.

21. Estimate the size of your heart.

22. Compare your measurements and estimates with classmates’. What do you notice?

23. How big do you think your fist and heart will be in 10 years? Explain your reasoning.
A **meter** (m) is a metric unit used to measure long lengths.  

A door can be used as a benchmark for 1 meter (1 m).  
A door is *about* 1 meter wide.

1 meter = 100 centimeters  
1 m = 100 cm  
1 meter = 10 decimeters  
1 m = 10 dm

**Which unit is used to measure each: cm, dm, or m?**

1. length of a classroom  
2. width of the chalk board  
3. length of a pencil  
4. width of a computer screen  
5. length of a tennis court  
6. length of a carrot  
7. height of a desk lamp  
8. width of a dollar bill

**Choose the letter of the best estimate.**

9. length of a soccer field  
   a. 98 cm  
   b. 98 dm  
   c. 98 m  
10. width of a calculator  
    a. 9 cm  
    b. 9 dm  
    c. 9 m  
11. height of a pine tree  
    a. 30 dm  
    b. 30 m  
    c. 300 m  
12. height of a classroom  
    a. 4 cm  
    b. 40 dm  
    c. 4 m  
13. length of a piece of chalk  
    a. 6 cm  
    b. 6 dm  
    c. 6 m  
14. depth of a bathtub  
    a. 4 cm  
    b. 4 dm  
    c. 4 m  
15. distance around a wrist  
    a. 15 cm  
    b. 5 dm  
    c. 5 m  
16. length of a football  
    a. 25 cm  
    b. 10 dm  
    c. 1 m
Copy and complete the table. Describe any pattern you see.

| centimeters | 100 | 200 | 300 | ? | ? |
| decimeters  | 10  | ?   | ?   | 40 | ? |
| meters      | 1   | 2   | ?   | ? | ? |

Think...
1 m = 100 cm
2 m = 100 cm + 100 cm
2 m = 200 cm

Compare. Write <, =, or >.

18. 100 cm  ?  1 m  19. 3 m  ?  300 cm  20. 40 dm  ?  3 m
21. 5 m  ?  48 dm  22. 35 cm  ?  2 dm  23. 6 dm  ?  61 cm
24. 300 cm  ?  2 m  25. 33 dm  ?  3 m  26. 5 m  ?  500 cm
27. 200 cm  ?  2 dm  28. 23 dm  ?  230 cm  29. 6 m  ?  600 dm
30. 35 dm  ?  3 m  31. 44 cm  ?  4 dm  32. 450 cm  ?  4 m
33. 3 dm  ?  35 cm  34. 7 m  ?  70 dm  35. 14 dm  ?  150 cm

Order the measurements from longest to shortest.

36. 5 m, 8 cm, 48 dm  37. 244 cm, 13 cm, 2 m

Order the measurements from shortest to longest.

38. 4 m, 90 cm, 55 dm  39. 15 dm, 85 cm, 2 m

Problem Solving

40. A car is 3 m long. A boat is 9 m long. Which is longer? How much longer?

41. In gym class Janet jumped 8 dm. Sharon jumped 1 m. Who jumped farther?
The **kilometer (km)** is a metric unit used to measure long distances. A kilometer is *about* how far you can walk in 15 minutes.

1 kilometer = 1000 meters

1 km = 1000 m

**Remember:**

- 10 cm = 1 dm
- 100 cm = 1 m
- 10 dm = 1 m

**Which unit is used to measure each: cm, m, or km?**

1. width of a small picture
2. distance from home to school
3. length of a football field
4. length of a flashlight
5. distance between 2 cities
6. length of a truck

**Copy and complete the table.**

Describe any pattern you see.

<table>
<thead>
<tr>
<th>meters</th>
<th>1000</th>
<th>2000</th>
<th>3000</th>
<th>?</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>kilometers</td>
<td>1</td>
<td>2</td>
<td>?</td>
<td>4</td>
<td>?</td>
</tr>
</tbody>
</table>

**Think**

- 1 km = 1000 m
- 2 km = 1000 m + 1000 m
- 2 km = 2000 m

**Compare. Write <, =, or >.**

8. 1 km __ 1000 m
9. 100 m __ 1 km
10. 100 cm __ 2 m
11. 3 m __ 300 cm
12. 3888 m __ 4 km
13. 5 km __ 4500 m
Niguel collects cans and newspapers for recycling. Here is a map of his city. Use the scale to find the actual distance.

**Problem Solving**

For problems 14–21 use the scale and a centimeter ruler.

14. Is the actual distance from Pinecrest to Spruce Hill about 2 km, about 4 km, or about 7 km?

15. Is the actual distance from Niguel’s house to Westview longer or shorter than 5 km?

16. What is the actual distance from school to the library?

17. Niguel traveled from school to Pinecrest to Spruce Hill. About how many kilometers did Niguel travel in all?

18. What is the map distance from Niguel’s house to Pinecrest?

19. What is the actual distance from Pinecrest to Spruce Hill?

20. On the way to school, Niguel stopped at Pinecrest. How many kilometers did he travel in all?

21. What is the shortest route from Spruce Hill to school? How long is the route?

**Challenge**

22. Katie walked 2600 m on Saturday and 3200 m on Sunday. About how many kilometers did Katie walk altogether?
The **milliliter (mL)** and **liter (L)** are metric units used to measure the amount of liquid a container holds.

- The milliliter can be used to measure small amounts of liquid. There are about 20 drops of water in 1 mL.

- The liter can be used to measure large amounts of liquid. The liter is the amount of liquid that fills about 4 glasses.

1 liter = 1000 milliliters  
1 L = 1000 mL

**Write less than a liter, about 1 liter, or more than a liter for the amount of liquid each real object holds.**

1. glass of juice  
2. pool  
3. bucket  
4. pitcher  
5. cooler  
6. fish tank
Which unit is used to measure each: mL or L?

7. liquid in a test tube
8. water in a bucket
9. water in a bathroom cup
10. paint in a small can
11. bottle of detergent
12. fruit punch in a bowl

Choose the letter of the best estimate.

13. water in a kitchen sink
   a. 20 mL  b. 2 L  c. 20 L
14. water in a wading pool
   a. 50 mL  b. 100 mL  c. 100 L
15. juice in a picnic jug
   a. 3 mL  b. 3 L  c. 30 L

Copy and complete the table. Describe any pattern you see.

<table>
<thead>
<tr>
<th>milliliters</th>
<th>1000</th>
<th>2000</th>
<th>3000</th>
<th>?</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>liters</td>
<td>1</td>
<td>2</td>
<td>?</td>
<td>4</td>
<td>?</td>
</tr>
</tbody>
</table>

Compare. Write <, =, or >.

17. 1423 mL  ?  1 L
18. 3 L  ?  2500 mL
19. 3 L  ?  3000 mL
20. 2 L  ?  3500 mL
21. 4000 mL  ?  4 L
22. 5 L  ?  4500 mL
23. 5000 mL  ?  6 L
24. 6 L  ?  5100 mL
25. 4860 mL  ?  5 L

Problem Solving

26. Sam is having a party with 10 friends. Does he need 5 L or 5 mL of juice?
27. Laurie drinks about 50 mL of milk each day. About how much does she drink in 5 days?
The gram (g) and kilogram (kg) are metric units used to measure mass.

The gram can be used to measure light objects. A small feather can be used as a benchmark for 1 gram (1 g). A small feather has a mass of about 1 gram (1 g).

The kilogram can be used to measure heavy objects. A textbook can be used as a benchmark for 1 kilogram. A textbook has a mass of about 1 kilogram (1 kg).

1 kilogram = 1000 grams
1 kg = 1000 g

Write more than a kilogram, about 1 kilogram, or less than a kilogram for the mass of each real object.

1. bag of potatoes
2. bananas
3. rooster
4. cracker
5. dog
6. muffin
Which unit is used to measure each: g or kg?

7. computer
8. comb
9. classmate
10. toothbrush
11. bowling ball
12. letter

Choose the letter of the best estimate.

13. fly
   a. 2 g
   b. 200 g
   c. 20 kg
14. horse
   a. 30 g
   b. 30 kg
   c. 300 kg
15. dog
   a. 25 g
   b. 25 kg
   c. 250 kg

Copy and complete the table.
Describe any pattern you see.

<table>
<thead>
<tr>
<th></th>
<th>g</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>grams</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>kilograms</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Compare. Write <, =, or >.

16. 3000 g  ?  3 kg
17. 2500 g  ?  2 kg
18. 4 kg  ?  4100 g
19. 5000 g  ?  5 kg
20. 1500 g  ?  2 kg

Problem Solving

23. Jason’s pet has a mass of 8 kg.
    June’s pet has a mass of 8120 g.
    Whose pet is heavier?
    How much heavier?

24. Sue’s books have a mass of 6 kg.
    Tom’s books have a mass of 5500 g.
    Whose books are heavier? How much heavier?

Test Preparation

25. Melissa has 4 pieces of chicken. They have a total mass of 675 g. Each of 3 of the pieces of chicken has a mass of 175 g. What is the mass of the fourth piece of chicken?
   A 525 g
   B 150 g
   C 50 g
Sometimes a problem uses different units of measure, such as gallons and quarts. To solve the problem, you can rename one unit of measure so both units are the same.

Use two rules to rename measures:

- To rename a larger unit as a smaller unit, multiply.
- To rename a smaller unit as a larger unit, divide.

**1 gal = ? qt**  
Think: 1 gal = 4 qt  
2 × 4 = 8  
So, 2 gal = 8 qt.

**3 dm = ? cm**  
Think: 1 dm = 10 cm  
3 × 10 = 30  
So, 3 dm = 30 cm.

**1 pt = 2 c**  
**1 yd = 3 ft**

**1 qt = 2 pt**  
**1 dm = 10 cm**

**1 gal = 4 qt**  
**1 m = 10 dm**

**Rename each unit of measure.**

1. 10 c = ? pt  
2. 4 m = ? dm  
3. 7 qt = ? pt  
4. 4 yd = ? ft  
5. 20 cm = ? dm  
6. 16 qt = ? gal  
7. 90 dm = ? m  
8. 9 pt = ? c  
9. 5 dm = ? cm

**Compare. Write <, =, or >.**

10. 12 c ? 6 pt  
11. 8 m ? 70 dm  
12. 3 gal ? 16 qt

13. 5 yd ? 12 ft  
14. 10 dm ? 100 cm  
15. 3 qt ? 5 pt
16. Meg has 24 feet of ribbon. How many yards of ribbon does she have?

17. Which is longer, a 7-yard rope or one that is 18-feet long?

18. A tree in Dan’s backyard is 7 meters tall. His neighbor has a tree that is 60 decimeters tall. Which tree is taller?

19. Judy bought 5 quarts of fresh orange juice. The store sells the juice for $2 per pint. How much did Judy spend?

20. Abby has 28 quarts of syrup. Does she have enough syrup to fill seven 1-gal containers?

21. Joan sold 9 gallons of apple cider at the state fair. Dori sold 40 quarts of cider at the fair. Who sold more cider?

22. Annie made 16 cups of fresh lemonade. She gave an equal amount of lemonade to each of her 8 grandchildren. If she finished the lemonade, how many pints of lemonade did each grandchild receive?

23. Jeff needs 50 decimeters of lumber to repair a window frame. The store sells lumber by the meter. How many meters of lumber should Jeff buy?

24. Multiply: \( \frac{4}{12} \times \frac{12}{12} \)

   Think: 4 groups of 12.

   \( 12 + 12 + 12 + 12 = \) ?

   So, \( 4 \text{ ft} = \) ? in.

25. \( 5 \text{ ft} = \) ? in.

26. \( 7 \text{ ft} = \) ? in.

27. \( 8 \text{ ft} = \) ? in.

28. \( 10 \text{ ft} = \) ? in.
Each measuring tool is used for a different purpose.

Jena is measuring different objects. Which tools can she use to measure each?

- To find the length of her bed, she can use a tape measure, a yardstick, or a meterstick.

- To find the mass of her dog, she can use a scale or a balance.

- To find how much water is in her fish tank, she can use a quart, a liter, or a gallon.

Which tools could you use to measure each?

1. length of a classroom
2. weight of an apple
3. amount of juice in a jug
4. height of a doorway
5. amount of water in a birdbath
6. width of your thumbnail
Match each object with the tool you would use to find each measure.

7. length of a pool
   a. centimeter ruler
8. capacity of a pitcher
   b. inch ruler
9. width of a book
   c. tape measure
10. thickness of a quarter
    d. scale
11. weight of a fish
    e. gallon

CHALLENGE

Copy and complete the table for exercises 12–14.

<table>
<thead>
<tr>
<th>Object</th>
<th>Estimate</th>
<th>Measuring Tool</th>
<th>Actual Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. Choose 3 objects in the classroom that have different weights. Estimate the weight or mass of each object. Arrange the objects in order from lightest to heaviest. Then find the actual measure of each.

13. Choose 3 objects in the classroom that have different lengths. Estimate the length of each object. Arrange the objects in order from shortest to longest. Then find the actual measure of each.

14. Choose 3 objects that hold different amounts of liquid. Estimate the amount of liquid each object will hold. Arrange the objects in order from the greatest amount to the least amount. Then find the actual measure of each.

15. Explain how it is possible for two objects of the same length to have different weights. Give an example.
A thermometer is used to measure temperature.

The degree Fahrenheit (°F) is used to measure temperature.

The temperature on a very cold day may be 2°F.

The temperature on a very hot day may be 96°F.

Each line on this Fahrenheit thermometer stands for 2 degrees Fahrenheit.

The degree Celsius (°C) is the metric unit used to measure temperature.

The temperature on a very cold day may be −10°C.

The temperature on a very hot day may be 30°C.

Each line on this Celsius thermometer stands for 1 degree Celsius.
Choose the letter of the most reasonable temperature.

1. ice cube    a. 30°F   b. 60°F   c. 90°F
2. hot cocoa   a. 23°F   b. 48°F   c. 120°F
3. classroom   a. 12°F   b. 70°F   c. 109°F
4. frozen yogurt a. 0°C   b. 20°C   c. 32°C
5. bowl of hot cereal a. 45°C   b. 0°C   c. 75°C
6. warm bath   a. 90°C   b. 40°C   c. 65°C

Write each temperature.

7. [Diagram of thermometer with temperatures from 0°F to 50°F]
8. [Diagram of thermometer with temperatures from 0°F to 110°F]
9. [Diagram of thermometer with temperatures from 0°F to 80°F]
10. [Diagram of thermometer with temperatures from 0°C to 5°C]
11. [Diagram of thermometer with temperatures from 0°C to 95°C]
12. [Diagram of thermometer with temperatures from 0°C to 25°C]

13. Describe what the weather is like today. Estimate the temperature in both degrees Fahrenheit and degrees Celsius. Then ask your teacher what the actual temperature is in both units. How close was your estimate?

14. Record the temperature every day for one week. Display your results in a bar graph. What was the highest temperature? the lowest? What was the range of temperature?
Quarter Hour

Remember: 1 hour = 60 minutes

- There are 15 minutes in one quarter hour.
  Read this time as: two fifteen, or quarter past two, or quarter after two.
  Write in standard form as: 2:15.

- There are 30 minutes in one half hour.
  Read this time as: two thirty, or half past two, or thirty minutes after two.
  Write in standard form as: 2:30.

- There are 45 minutes in three quarters of an hour.
  Read this time as: two forty-five, or quarter to three.
  Write in standard form as: 2:45.

Tell how many minutes are in:

1. 1 hour 15 minutes  
2. 1 hour 45 minutes  
3. 2 hours  
4. 1 hour 30 minutes  
5. 2 hours 15 minutes  
6. 2 hours 30 minutes
Write each time in standard form.


Draw the time. Show the hour and minute hands.

15. 16. 17. 18.

Write the time in words. Use A.M. or P.M.

19. 20. 21. 22.

dinnertime lunchtime breakfast time time school begins

Do You Remember?

Complete the sentences. Use the words in the box.

23. The _____ is the middle number in a set of ordered data.
24. The _____ is the average of the data.
25. The _____ for a set of data is the item that occurs most frequently.
Minutes

Each mark on this clock stands for 1 minute (min). It takes five minutes for the minute hand to move from one number to the next.

This clock shows 5 minutes after 10. Write in standard form as: 10:05.

Remember: 60 min = 1 h

This clock shows 10:36. Read this time as: ten thirty-six, or 36 minutes after 10, or 24 minutes before 11.

Write each time.

1. 15 minutes after 12
   45 minutes before 1

2. ? minutes after ?
   ? minutes before ?

3. ? minutes after ?
   ? minutes before ?

4. ? minutes after ?
   ? minutes before ?

5. ? minutes after ?
   ? minutes before ?

6. ? minutes after ?
   ? minutes before ?
Write the time in standard form.
7. 25 minutes before 9  8:35
8. 53 minutes past 2
9. 3 minutes after 3
10. 1 minute before 10
11. 40 minutes past 5
12. 15 minutes before 7
13. 21 minutes after 4
14. 6 minutes before 8
15. 18 minutes past 10
16. 32 minutes after 1
17. 5 minutes before 12
18. 2 minutes past 9

Draw the time. Show the hour and minute hands.
19. 4:12
20. 6:53
21. 3:41
22. 8:27

Estimating Time
Curt’s school bus came at 7:25 A.M. this morning. At about what time did Curt’s school bus come?

Think
7:25 is close to 7:30

Curt’s school bus came at about 7:30 A.M.

Problem Solving
23. Margaret practices the piano everyday at 3:55. About what time does she practice piano?
24. Louis watches the news at 6:35 P.M. Is this time closer to 6:00 P.M. or to 7:00 P.M.?
25. Recess begins at 10:20. About what time does recess begin?
26. Jonathan takes a bath at 7:25. Rose takes a bath at 7:55. Who takes a bath closer to 7:30?
8-16 **Elapsed Time**

The amount of time between two given times is **elapsed time**.

Gina leaves school at 3:05. She arrives home at 3:25. How long does it take Gina to get home from school?

To find how long it takes Gina to get home, count by 5s.

| Start at 3:05. | 3:05 | 5 minutes |
| Count by 5s to 3:25. | 3:10 | 3:15 | 3:20 | 3:25 |
| | | 10 minutes | 15 minutes | 20 minutes |

It takes Gina 20 minutes to get home.

Jim has recess at 10:20 A.M. He eats lunch at 12:30 P.M. How much time is between recess and lunchtime?

To find how much time is between recess and lunchtime, count by ones. Then count by 5s.

| Start at 10:20 A.M. | 10:20 | 11:20 | 12:00 | 12:20 | 12:25 | 12:30 |
| Count by ones to 12:20 P.M. | 11:20 | 12:00 | 12:20 | 12:25 | 12:30 |
| Count by 5s to 12:30 P.M. | 12:25 | 12:30 |

There are 2 hours, 10 minutes between recess and lunchtime.
What time will it be in 15 minutes if it is now:
1. 3:30  
2. 10:05  
3. 6:35  
4. 9:45  

What time will it be in 2 hours?
5. 6:30  
6. 5:15  
7. 9:50  
8. 7:45  

What time will it be in 1 hour, 20 minutes?
9. 1:10  
10. 3:30  
11. 5:05  
12. 8:35  

Find the elapsed time.
13. 6:05 A.M.  
14. 7:10 P.M.  
15. 2:30 A.M.  
16. 3:20 P.M.  
6:25 A.M.  
7:40 P.M.  
2:45 A.M.  
3:50 P.M.  

17. 1:05 A.M.  
18. 4:20 P.M.  
19. 11:30 A.M.  
20. 10:45 A.M.  
3:05 A.M.  
9:20 P.M.  
1:00 P.M.  
1:30 P.M.  

Estimate the time it will be in 20 minutes.
21. 2:15  
22. 4:05  
23. 7:35  
24. 11:30  
about 2:30  

How long does it take to go from:
25. Rockford to Maywood?  
26. Orlando to Rockford?  
27. Orlando to Maywood?  

<table>
<thead>
<tr>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
</tr>
<tr>
<td>Orlando</td>
</tr>
<tr>
<td>Rockford</td>
</tr>
<tr>
<td>Maywood</td>
</tr>
<tr>
<td>Bay City</td>
</tr>
</tbody>
</table>

DO YOU REMEMBER?

Find the median of each set of data.
28. 7, 3, 5, 9, 4, 7, 2  
29. 14, 10, 9, 7, 8, 12, 18
Chapter 8292

Calendar

A calendar organizes the days of the week into months and years. This is the calendar for the month of November.

<table>
<thead>
<tr>
<th>NOVEMBER (Nov.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>22</td>
</tr>
<tr>
<td>29</td>
</tr>
</tbody>
</table>

Look at the days and dates of the week.

- There are 30 days in November.
- The day of the week for November 10th is Friday.
- The date of the first Monday is November 6.

Election day  Thanksgiving day

1 day (d) = 24 hours (h)  1 year (y) = 365 days
1 week (wk) = 7 days  = 52 weeks
= 12 months (mo)
1 leap year = 366 days

Complete.

1. Each year has [ ] months.  2. Every week has [ ] days.
3. Each year has about [ ] weeks.  4. Every year usually has [ ] days.

Practice

5. Give the day of the week for:
   a. November 22nd  b. Election day  c. the last day of November

6. Give the date in November for the:
   a. 4th Monday  b. last Saturday  c. day before Thanksgiving
Use the calendar above.

7. Which months have 30 days?
9. Which is the third month?
11. Which day is October 28th?
13. Give the date for the first Sunday in August.

8. Which months have 31 days?
10. Which is the last month?
12. Which day is June 25th?
14. How many days is it from October 28th to November 1?

Writing Dates

You can write dates using numbers.

November 30, 2010

Use 11 for the 11th month. 11 / 30 / 10 Use 10 for the year 2010.

Use 30 for the 30th day.

Study this example: Write May 28, 2009 as 5/28/09.

Write each date in two ways.

15. your birth date 16. today’s date 17. last day of school
Problem-Solving Strategy: Make a Table

Meg's family is having a party. Meg will make ice for the punch. Each tray of ice makes 12 cubes. How many ice cubes will Meg make if she uses 5 trays?

**Read**
Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

**Facts:** each tray makes 12 ice cubes use 5 trays

**Question:** How many ice cubes in 5 trays?

**Plan**
Make a table showing from 1 to 5 trays. Add to find the number of ice cubes for each tray.

Record each sum where it belongs in the table.

**Think**
One tray makes 12 cubes. Add 12 for each tray.

**Solve**

<table>
<thead>
<tr>
<th>Tray</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice Cubes</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>60</td>
</tr>
</tbody>
</table>

12 + 12 + 12 + 12 + 12 = 60

Look at your completed table.
Meg will make 60 ice cubes using 5 trays.

**Check**
Use a picture or models to check your answer.

The answer checks.
Make a table to solve each problem.

1. Ray is making friendship bracelets for his friends. Each bracelet will have 16 beads on it. How many beads will Ray need to make 4 bracelets?

   Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

   **Facts:** 4 bracelets to make 16 beads on each bracelet

   **Question:** How many beads will Ray need?

   Make a table showing from 1 to 4 bracelets. Add 16 beads for each bracelet. Fill in the table.

<table>
<thead>
<tr>
<th>Bracelet</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beads</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   2. Matt collects baseball cards. He has 14 cards for each of his favorite teams. He has 6 favorite teams. How many baseball cards does Matt have?

   3. Fiona puts flowers into boxes. She puts 18 flowers into each box. How many flowers will she use to fill 5 boxes?

   4. Carmen’s mom puts money into a parking meter. It costs $.15 for each minute. She plans to park for 8 minutes. How much money should Carmen’s mom place in the meter?

   5. Write a problem that can be solved by making a table. Ask a classmate to solve it.
Problem-Solving Applications: Mixed Review

Solve each problem and explain the method you used.

1. Keri rides her bicycle around the park a dozen times each week. Which unit of measure should she use to record the distance she rides: inches, feet, or miles?

2. Ms. Walls measured the length of the floor in the family room. Which is the most reasonable length: 12 feet, 12 inches, or 12 yards?

3. Robin’s test tube is $3\frac{1}{4}$ in. tall. Calvin’s beaker is $3\frac{1}{2}$ in. tall. Whose glassware is taller?

4. Joy’s pet gained an average of 3 oz each week. In 6 weeks about how many pounds did her pet gain?

5. Matt used 7 pt of salt water and 3 qt of fresh water for an experiment. Did he use more fresh water or more salt water?

Use the map for problems 6–8.

6. How many centimeters is the ant from the sandwich? from the basket?

7. How much closer is the ant to the flower than to the basket?

8. An ant walks from the basket to the flower. Then it walks to the sandwich and back to the basket. Does the ant walk more or less than 1 decimeter?
Choose a strategy from the list or use another strategy you know to solve each problem.

9. Every 5 min a scientist added 200 mL of water to the fish tank. How long will it take her to add a liter of water?

10. Gil got up at 7 o’clock. He also went to the movies at 7 o’clock. How is this possible?

11. Lenore began her science experiment on February 20. She finished one week later. On what date did she finish?

12. In science class the students found that each test tube has a mass of 32 g and is 12 cm long. Will ten test tubes be heavier or lighter than one kilogram?

13. At 8:45 the outdoor temperature was 56°F. When Molly measured the temperature 50 minutes later, it was 5° warmer. What were the time and temperature when Molly measured again?

14. Every quarter hour two postal trucks leave the dock. How many trucks leave each hour?

15. Mother drove 10,560 ft to the mall. How many miles did she drive to the mall?

16. From a starting point Tran drew a line down 2 in. From there he drew a line to the right 1 in. Name the letter he drew.

17. Use a centimeter ruler to draw a letter. Write a problem modeled on problem 16. Have a classmate solve it.
Choose the letter of the best estimate.  

1. length of a bed  
   a. 7 ft  
   b. 7 in.  
   c. 7 yd

2. length of a river  
   a. 100 ft  
   b. 50 yd  
   c. 3 mi

Compare. Write <, =, or >.  

3. 3 pt  ?  6 c  
4. 1 gal  ?  3 qt  
5. 100 oz  ?  3 lb

Which unit is used to measure each: cm, dm, m, or km?  

6. width of a student desk  
7. distance to the moon  
8. height of a bookshelf  
9. width of a toothbrush

Which unit is used to measure each: mL or L?  

10. dose of medicine  
11. juice in a glass  
12. soda in a large bottle  
13. water in a bathtub

Which unit is used to measure each: g or kg?  

14. bag of sugar  
15. teaspoon of salt  
16. dinner roll

Problem Solving

17. Margaret is going on vacation.  
The temperature where she is going is 15°F. Do you think she is going to the beach or to a ski resort?

18. John left for lunch at a quarter to twelve. He returned at 1:10. How long was he gone?

19. How much time is between 9:30 A.M. and 11:15 A.M.?  

20. Name the months that have 31 days.
Compare Systems of Measure

You can use what you know to help you compare customary and metric measures.

**Capacity**

One gallon is about 4 liters.

**Weight and Mass**

Two pounds is about 1 kilogram.

**Length**

One inch is about 2.5 centimeters.

Two inches is about 5 centimeters.

Complete each sentence.

1. Ten cm is about ? inches.
2. Five gal is about ? L.
3. Twenty-four L is about ? gal.
4. Eighteen lb is about ? kg.
5. Eight in. is about ? cm.
6. 6 kg is about ? lb.

Compare. Write <, =, or >.

7. 9 gal ? 32 L
8. 7 kg ? 10 lb
9. 8 in. ? 25 cm
10. 40 L ? 8 gal
Chapter 8 Test

Choose the letter of the best estimate.

1. length of a car  
   a. 6 yd  
   b. 30 ft  
   c. 50 in.
2. height of a mountain  
   a. 2 mi  
   b. 20 yd  
   c. 60 ft

Compare. Write <, =, or >.

3. 2 pt ___ 3 c  
4. 2 gal ___ 9 qt  
5. 56 oz ___ 4 lb

Which unit is used to measure each: cm, dm, m, or km?

6. length of a thumb  
7. distance from Denver to Chicago
8. height of a tree  
9. width of a penny

Which unit is used to measure each: mL or L?

10. milk in a baby bottle  
11. gas in a car tank
12. water in a fish tank  
13. tea in a cup

Which unit is used to measure each: g or kg?

14. man  
15. goldfish

Write the time in standard form.

16. quarter to four  
17. 17 minutes after 11

Problem Solving

Use a strategy you have learned.

18. How much time is between 10:45 P.M. and 11:00 P.M.?

Tell About It

19. Explain how to tell how many \( \frac{1}{4} \) in. units are in a 2-inch line.

Performance Assessment

20. Choose two times that result in an elapsed time of 50 minutes.

11:15 A.M.  11:50 A.M.
12:05 P.M.  12:40 P.M.
Test Preparation

Choose the best answer.

1. \[ \frac{3}{x} \times 6 \]
   - a. 9
   - b. 18
   - c. 36
   - d. not given

2. Estimate. weight of an apple
   - a. 5 oz
   - b. 5 lb
   - c. 50 oz
   - d. 50 lb

3. \[ 700 - 198 \]
   - a. 502
   - b. 602
   - c. 618
   - d. 698

4. \[ 7 \times 9 \]
   - a. 79
   - b. 72
   - c. 63
   - d. 16

5. \( \frac{15}{5} \)
   - a. 3
   - b. 4
   - c. 10
   - d. 20

6. \[ 88 + 321 + 647 + 50 \]
   - a. 996
   - b. 1006
   - c. 2348
   - d. not given

7. Which unit is used to measure the height of a flagpole?
   - a. cm
   - b. dm
   - c. m
   - d. km

8. \[ ? = 5 \times 5 \]
   - a. 0
   - b. 1
   - c. 10
   - d. 25

9. \[ 7 \sqrt{56} \]
   - a. 8
   - b. 9
   - c. 49
   - d. 63

10. Choose the standard form of the number. \[ 9,000 + 500 + 30 + 7 \]
    - a. 9537
    - b. 9807
    - c. 14,037
    - d. 90,537

11. \[ 8\text{c} \div 2 \]
    - a. 10\text{c}
    - b. 6\text{c}
    - c. 4\text{c}
    - d. not given

12. What time will it be in 1 hour, 20 minutes, if it is now 7:45?
    - a. 8:05
    - b. 8:45
    - c. 9:05
    - d. 9:10

13. \[ \$77.49 - 16.98 \]
    - a. \$60.50
    - b. \$60.51
    - c. \$61.45
    - d. \$61.51

14. Estimate. height of a man
    - a. 3 yd
    - b. 6 ft
    - c. 36 in.
    - d. 10 ft

15. \[ 36 \div 9 \]
    - a. 45
    - b. 36
    - c. 5
    - d. 4

16. \[ 8562 + 658 \]
    - a. 8116
    - b. 9110
    - c. 9120
    - d. 9220
17. Choose the most reasonable temperature for a summer day.
   a. 30°F  
   b. 40°C  
   c. 50°F  
   d. 90°C

20. How many weeks does every year have?
   a. 7  
   b. 12  
   c. 52  
   d. 365

21. 1¢  
   × 7
   a. 7¢  
   b. 8¢  
   c. 17¢  
   d. not given

22. 3)18
   a. 5  
   b. 6  
   c. 7  
   d. 8

23. 7003 – 465
   a. 2353  
   b. 6648  
   c. 7468  
   d. not given

18. How many more pies were sold on Friday than on Tuesday?
   a. 2  
   b. 4  
   c. 6  
   d. 8

19. Emily has 8 nieces and nephews. She gives each of them 8 dollars. How much money does Emily give out altogether?
   a. $1  
   b. $16  
   c. $64  
   d. $72

24. How many ways can you arrange in a line a triangle, a square, a red rectangle, and a blue rectangle if the rectangles are not side by side?
   a. 4  
   b. 8  
   c. 12  
   d. 16

Tell About It

Explain how you solved each problem. Show all your work.

25. Cedric has to fill four 1-gal jugs with water. He uses a container that holds 1 qt of water. How many times does Cedric fill the 1-qt container?

26. For the trip to the museum, some students arrived in 5 vans. There were 6 students in each van. Four more students walked to the museum. How many students went to the museum?
Sunflakes
If sunlight fell like snowflakes, gleaming yellow and so bright, we could build a sunman, we could have a sunball fight, we could watch the sunflakes drifting in the sky. We could go sleighing in the middle of July through sundrifts and sunbanks, we could ride a sunmobile, and we could touch sunflakes—I wonder how they’d feel.

Frank Asch

In this chapter you will:
Explore plane and solid figures, perimeter, area, and volume
Learn about congruent and similar figures, symmetry, and ordered pairs
Study how figures move
Solve problems by solving a simpler problem

Critical Thinking/Finding Together
Look at the sunflakes. How are they alike? How are they different? Trace a sunflake and fold the tracing in half. Tell what happens.
A **line** is straight. It is a set of points that extends forever in opposite directions.

A **line segment** is the part of a line between two endpoints.

A **ray** is the part of a line that starts at an endpoint. It goes on forever in one direction.

**Name each:** line, line segment, ray, or none of these.

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8.
**Special Lines**

**Intersecting lines** are lines that meet at a common point.

**Parallel lines** are lines on a flat surface that never intersect.

**Perpendicular lines** are lines that intersect at square corners.

---

**Using the street map above, answer these questions.**

9. Name two streets that are parallel.
10. Name two streets that are perpendicular.

**Copy these lines onto dot paper.**

11. is parallel to the red line.
12. is parallel to the green line.
13. intersects the red line and the blue line.
14. intersects the green line and the purple line.

**CRITICAL THINKING**

15. Which picture is most like a ray? Explain.
Angles are formed by two rays that start out from the same point.

Angles have special names.

- **right angle** forms a square corner
- **acute angle** less than a right angle
- **obtuse angle** greater than a right angle

How many angles does each figure have?

Tell if the angle is a right angle, an acute angle, or an obtuse angle.
Tell if the angle formed by the hands of the clock is a right angle, an acute angle, or an obtuse angle.

9. 10. 11.

Use Figures A and B for exercises 12–14.

12. Which figure has 1 right angle?

13. Which figure has 2 right angles?

14. Which figure has 2 acute angles?

Use grid paper to make block capital letters.

15. How many right angles do the letters L and F each have?

16. Which letters of the alphabet have more than three right angles?

17. Draw two different acute angles and two different obtuse angles.

TEST PREPARATION

18. Which triangle has one right angle?
A polygon is any closed flat figure with straight sides. Polygons also have special names.

- Triangle
- Square
- Rectangle
- Rhombus
- Pentagon
- Hexagon
- Octagon

Any polygon with 4 straight sides is called a quadrilateral. A quadrilateral that has opposite sides, parallel and equal, is a parallelogram. A quadrilateral with only one pair of parallel sides is a trapezoid.

Materials: dot paper, record sheet

**Step 1**
Label the columns on your record sheet with the following headings:

<table>
<thead>
<tr>
<th>Figure</th>
<th>Number of Sides</th>
<th>Number of Vertices</th>
<th>Number of Angles</th>
<th>Is It a Quadrilateral?</th>
</tr>
</thead>
</table>

**Step 2**
Copy the names of the following figures onto your record sheet: triangle, square, rectangle, rhombus, trapezoid, pentagon, hexagon, and octagon.

**Step 3**
Draw each figure listed on dot paper.
How many sides does each figure have?
How many vertices and angles does each figure have?
Is the figure a quadrilateral?
**Step 4**

Cut four 6-in. strips and four 4-in. strips from drinking straws.

From the 8 strips how many of each of these figures can you form?

12. triangles  
13. squares  
14. pentagons  
15. rectangles  
16. hexagons  
17. octagons

**Step 5**

Use a coin to trace a circle.

How many sides does a circle have?

How many vertices and angles does a circle have?

Is a circle a polygon? Explain your answer.

---

**Communicate**

1. Look at the data on your record sheet.
   What pattern do you notice?

2. Explain why squares, rectangles, and rhombuses are parallelograms. How are they alike? How are they different?


Is each figure a polygon? Write Yes or No.

4. 5. 6. 7. 8. 9. 10. 11.

**CHALLENGE**

Cut four 6-in. strips and four 4-in. strips from drinking straws.

From the 8 strips how many of each of these figures can you form?

12. triangles  
13. squares  
14. pentagons  
15. rectangles  
16. hexagons  
17. octagons
**9-4 Triangles**

Triangles are polygons with three sides.

These are **right triangles**. Each has one right angle.

These are **isosceles triangles**. An isosceles triangle has at least two sides of equal length.

These are **equilateral triangles**. All the sides of an equilateral triangle are equal in length.

These are **scalene triangles**. A scalene triangle has no sides of equal length.

Identical marks indicate congruent sides of the figure.
Name each triangle.

1.  

2.  

3.  

4.  

5.  

6.  

7.  

8.  

Problem Solving

9. You wish to draw an equilateral triangle. You make one side of the triangle 3 inches long. How long do you make each of the other sides of the triangle?

10. Draw a right triangle, an isosceles triangle, an equilateral triangle, and a scalene triangle on dot paper. Look at all three angles in each triangle. Color all acute angles blue.

11. Name two ways that you can sort triangles.

12. Joe cuts out 2 congruent right triangles. What quadrilateral can he make from the 2 triangles?

CHALLENGE

13. Look at the angles in each triangle. Identify the acute and obtuse triangles.
9-5 Congruent and Similar Figures

Congruent figures have the same size and the same shape. Two figures are congruent if one can be moved to fit exactly over the other.

The triangles are congruent figures.

The circles are congruent figures.

The rectangles are not congruent figures.

Similar figures have the same shape. They may or may not be the same size.

same shape different size

same shape same size

same shape different size

Do the pairs look congruent? Write Yes or No.

1.

2.

3.

Do the figures look similar? Write Yes or No.

4.

5.

6.
Copy the figures onto dot paper. Then draw figures that are congruent to each.

7. 

8. 

9. 

Draw each figure on dot paper. Then double each side to draw a similar figure.

10. 

11. 

12. 

13. Explain in your Math Journal the difference between congruent and similar figures.

14. Can congruent figures be similar? Explain your answer.

15. Can similar figures be congruent? Explain your answer.

16. Laura writes a letter to her cousin. She puts the letter in an envelope. Then she puts a square stamp on the envelope. Identify and draw the figures that represent Laura’s letter, envelope, and stamp. Are any of these figures congruent? Explain your answer.
Ordered pairs locate points on a graph.

Look at the graph. What animal is at point (5,1)?

To find out:
- Begin at 0.
- The first number tells you to move 5 spaces to the right.
- The second number tells you to move 1 space up.

The cat is located at point (5,1).

Locate the mouse. Name the ordered pair for that point.

The mouse is at the point (1,2). The mouse is 1 space to the right and 2 spaces up.

Use the graph to answer each question.

1. What animal is at (2,4)?
2. What animal is at (3,1)?

Write the ordered pair for each animal.

3. dog
4. bird
5. fish
6. squirrel

Use the graph to answer each question.

7. I am the animal two spaces to the right of the frog. What am I? Name the ordered pair of my position.

8. Tell how you would find the ordered pair to locate the chick.
Write the letter for each ordered pair. Use the graph at the right.

9. (1,2) 10. (4,4) 11. (3,3)
12. (2,1) 13. (1,5) 14. (4,1)
15. (2,3) 16. (3,2) 17. (4,5)
18. (4,0) 19. (1,6) 20. (5,5)
21. (5,3) 22. (0,1) 23. (6,0)

Write the ordered pair for each letter.


Write the place for each ordered pair. Use the graph at the left to locate each.

33. (1,5) 34. (2,3)
35. (1,1) 36. (3,6)
37. (3,0) 38. (1,2)

Write the ordered pair for each place.

39. Playground
40. Velma’s House
41. Park
42. Susan’s House
Each of these figures can be folded along the dashed line so that the two parts match.

The dashed line is a **line of symmetry**.

Some figures have two or more lines of symmetry.

**Is the dashed line a line of symmetry? Write Yes or No.**

1. K  
2. △  
3.  
4. ∖

**Use dot paper. Draw each figure and its matching part.**

5.  
6.  
7.  
8.  

9. Take an 8-inch square piece of paper. Fold it to see how many lines of symmetry a square has.
Chapter 9

9-8

Transformations

You can move an object by sliding, flipping, or turning it.

- A **slide**, or **translation**, is a move in a straight line without changing direction.

- A **flip**, or **reflection**, is a move over an imaginary line. A reflection puts the object in the opposite direction or on the opposite side.

- A **turn**, or **rotation**, is a move around a point. A rotation moves an object clockwise or counterclockwise.

Write how the object was moved:
translation, reflection, or rotation.

1. 2. 3.

Tell if the patterns show translations, reflections, or rotations.

7. 8. 9.

10. Name the two moves.
Solid figures are all around us. Some solid figures have faces, edges, and vertices.

A **face** is a flat surface surrounded by line segments. Two faces meet at a line segment called an **edge**. Three or more edges meet at a **vertex**.

Some solid figures do not have faces, edges, and vertices because they do **not** have line segments.

Solid figures have special names.

All solid figures are made up of connected **plane figures**. Notice that the shaded face of the rectangular prism is a rectangle.

A **net** is a pattern that can be folded to model a solid figure. This net folds on the dashed line segments to form a cube.
Complete the table.

<table>
<thead>
<tr>
<th>Solid Figure</th>
<th>Flat Surfaces</th>
<th>Curved Surfaces</th>
<th>Edges</th>
<th>Vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. cube</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. rectangular prism</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. pyramid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. cylinder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. sphere</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. cone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete the table.

<table>
<thead>
<tr>
<th>Net</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="Net" /></td>
<td><img src="image" alt="Net" /></td>
<td><img src="image" alt="Net" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Solid Figure</th>
<th>Number of Faces</th>
<th>Shape of Faces</th>
</tr>
</thead>
</table>

10. Compare the data in your first table for a cube and a rectangular prism. What do you notice?

11. Which solid figures have only flat surfaces?

12. Which solid figures have both flat surfaces and curved surfaces?

13. Which solid figure has only a curved surface?

DO YOU REMEMBER?

Add.

14. \(7 + 8 + 4 + 5\)  
15. \(52 + 43 + 52 + 43\)

16. \(19 + 19 + 19 + 19\)  
17. \(108 + 46 + 62 + 387\)
**Perimeter** is the distance around a plane figure. Add the lengths of the sides to find the perimeter.

First, measure to find the length of each side. Then add.

\[ P = 3 \text{ in.} + 1 \text{ in.} + 2 \text{ in.} + 1 \text{ in.} \]
\[ P = 7 \text{ inches} \]

Or, if the lengths are given, just add to find the perimeter.

\[ P = 3 \text{ cm} + 2 \text{ cm} + 2 \text{ cm} + 3 \text{ cm} + 1 \text{ cm} + 5 \text{ cm} \]
\[ P = 16 \text{ cm} \]

Estimate the perimeter of each figure in centimeters. Then use your centimeter ruler to find the perimeter.

1. [Figure 1]
2. [Figure 2]
3. [Figure 3]
4. [Figure 4]
5. [Figure 5]
6. [Figure 6]
Estimate the perimeter of each real object in inches. Then use your inch ruler to measure the perimeter of these objects to the nearest inch.

7. a closed folder
8. an open folder
9. a textbook
10. a flat desk top
11. Draw a figure with a perimeter of 14 inches. It may have any number of sides.
12. Draw a figure with a perimeter of 20 cm. It may have any number of sides.

**Problem Solving**

13. Alice made a square frame for her needlepoint. Each side measured 8 in. What was the outside perimeter of the frame?
14. Mr. Diaz uses wood to make a rectangular frame around the bedroom window. One side is 67 cm, and another is 95 cm. What is the outside perimeter of the window frame?

15. A rectangle measures 4 m on its shorter sides and 8 m on its longer sides. What is the perimeter of the rectangle?
16. A room is in the shape of a rectangle. It is 18 ft long and 12 ft wide. What is the perimeter of the room?

17. A pentagon has sides of equal length. Each side is 6 cm. A hexagon has sides of equal length. Each side is 5 cm. Does one of these figures have a greater perimeter than the other? If so, which one?
18. Mary draws a rectangle 9 inches long and 2 inches wide. Joan draws a rectangle 7 inches long and 3 inches wide. Whose rectangle has the greater perimeter?

**CRITICAL THINKING**

19. Can you use multiplication to find the perimeter of the frame in Problem 13? Explain.
Jamie has a new picture. One way to describe its size is to give its **area**.

Area is the number of square units needed to cover a surface.

1 square centimeter

1 cm

You can count the number of square units to find the area.

The area of the picture is 36 square centimeters.

Figures can have the same area but different perimeters.

The area is 5 square cm. The perimeter is 10 cm.

The area is 5 square cm. The perimeter is 12 cm.

Cut out centimeter squares. Use them to cover each figure. Find the area.

1. 
2. 
3. 

Use grid paper. Draw a rectangle for each area and perimeter.

4. area of 6 square cm perimeter of 10 cm
5. area of 6 square cm perimeter of 14 cm
Problem Solving

Use grid paper to help.

6. Make an outline of your hand with your fingers together on centimeter grid paper. Count squares to estimate the area of your hand.

7. Charisse puts a puzzle together. The finished puzzle measures 6 square units across and 3 square units down. What is the area of the puzzle?

8. Maria opened a box and laid it flat. (See right.) She wants to find the number of square units of wrapping paper needed to cover the box. How much wrapping paper does Maria need?

Write About It

9. Estimate which figure has the greater area. Check your answer. Explain the method you used to determine your answer.

10. Use grid paper to draw as many different figures as you can that have an area of 10 square units. How many figures did you draw? Do you think there are more figures that you can draw that have an area of 10 square units? Explain.
The volume of a solid figure is the number of cubic units the figure contains.

When you cannot see each cube in a figure, think about how many cubes are in each layer.

Look at the layers of cubes. There are 12 cubes in the top layer. There are 2 layers in this figure.

Add to find the volume.

\[12 + 12 = 24 \text{ cubic units}\]

The volume is 24 cubic units.

Find the volume in cubic units.

1. 2. 3.

4. 5. 6.

7. 8. 9.
Find the volume in cubic units.

10. 

11. 

12. 

Build the following figures with cubes. Find the volume in cubic units.

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>Number of cubes in each row</th>
<th>Number of layers</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>3</td>
<td>4</td>
<td>?</td>
</tr>
<tr>
<td>14.</td>
<td>2</td>
<td>6</td>
<td>?</td>
</tr>
</tbody>
</table>

15. Alice makes a pile of cubes. She makes one layer that has 3 rows of 3 cubes. She puts 2 more layers of the same size on top of the first layer. What is the volume of the pile?

16. Rick makes a box that is 2 cubes long, 3 cubes wide, and 2 cubes high. What is the volume of the box?

17. Joan uses cubes to make a rectangular prism that has 3 layers. The volume of the figure is 12 cubic units. How many cubes are in each layer?

18. Denis uses cubes to make a rectangular prism that has 5 layers. The volume of the figure is 20 cubic units. How many cubes are in each layer?

**Problem Solving**

19. two different solid figures, each made of 8 cubic units.

20. two different solid figures, each made of 11 cubic units.
Problem-Solving Strategy: Solve a Simpler Problem

Margaret made this design with rectangles. If the smallest rectangle has an area of 3 square units, what is the area of the whole design?

Read

Look at the design. Reread the problem. Focus on the facts and question.

List what you know.

Facts: area of smallest rectangle is 3 square units there are 3 rectangles in all

Question: What is the area of the whole design?

Plan

Solve a simpler problem. Using the red rectangle as a guide, find and record the area of the blue and green rectangles. Then add the three areas.

Solve

Red rectangle 3 square units
Blue rectangle (2 red) \[3 + 3 = 6\] square units
Green rectangle (3 red) \[3 + 3 + 3 = 9\] square units

3 + 6 + 9 = 18 square units

The area of the whole design is 18 square units.

Check

Cover the whole design with centimeter squares to check your answer.
Solve a simpler problem first to solve each problem.

1. Art wants to cover this design with red squares. He needs 4 red squares to cover each blue square. How many red squares does Art need to cover the whole design?

   Look at the design. Reread the problem. Focus on the facts and question.

   List what you know.

   **Facts:** 4 red squares cover one blue square

   **Question:** How many red squares cover the whole design?

   **Plan**

   First, find and record how many red squares cover the blue square and purple square.

   Blue squares \(4 + 4 = ?\)
   Purple square \(4 + 4 + 4 + 4 = ?\)

   Then add the two totals.

2. Ellen made this design. If the smallest rectangle has an area of 5 square units, what is the area of the whole design?

3. Don made this design. The small blue rectangles have an area of 2 square units. The green rectangles have an area of 3 square units. What is the area of the whole design?
Problem-Solving Applications: Mixed Review

Solve each problem and explain the method you used.

1. Yvonne used solid figures to make these 3 drawings. Name the solid figures.
   
   a. b. c.

2. Jamal drew this kite.
   a. Is the kite a quadrilateral?
   b. Is the kite a rectangle?
   c. How many acute angles does the kite have?
   d. What colors are the sides that are parallel?
   e. How many lines of symmetry does Jamal’s kite have?

3. Ben wants to make a square using the points on this grid.
   a. Name the ordered pairs of 4 points he should connect.
   b. What is the area of Ben’s square?
   c. Tess connected (0,3); (4,3); (4,1); (2,1); (1,0). What polygon did she make?

Write always or never to make each sentence true.

4. A square ? has 4 right angles.
5. A circle is ? a polygon.
6. A line ? has 2 endpoints.
8. When two squares are the same size, they are ? congruent figures.
9. When Leanne traces the shape of a dime and of a quarter, she ? makes similar figures.
Choose a strategy from the list or use another strategy you know to solve each problem.

10. The letter H looks the same after 1 half rotation. Name 3 other letters that look the same after 1 half rotation.

11. Bryan wrote the numbers between 4 and 10 once in these figures. He wrote even numbers in the square and odd numbers in the triangle. The difference in the products of the numbers inside the triangle and the square is 15. The sum of the numbers inside the circle is 20. In which figure did Bryan write each number?

12. Four people can sit around a square table. When two tables are pushed together, 6 people can sit around them. How many people can sit around five tables that are pushed together?

13. Tawny put a fence around her garden. Each side measured 8 yards. Find its perimeter.

14. Ms. Glenic made a quilt from squares of fabric. The quilt is 8 squares across and 5 squares down. How many squares did she use to make the quilt?

15. Koyi made this design. If there are 4 square units in one small rectangle, what is the area of the whole design?

16. Jamal built the castle pictured at the right. Which solid figures did he use in building his castle? How many of each solid figure did he use?
Check Your Progress
Lessons 1–14

Name the figure. Then tell how many sides or edges, faces, and vertices each has. (See pp. 308–309, 318–319.)

1. [Hexagon]
2. [Pentagon]
3. [Cone]
4. [Pyramid]

Draw each. (See pp. 304–307.)

5. line
6. parallel lines
7. right angle

Do the figures look congruent? Write Yes or No. (See pp. 312–313.)

8. 

Do the figures look similar? Write Yes or No. (See pp. 314–315, 317.)

9. 

Write the ordered pairs.

10. 

Write the type of transformation. (See pp. 314–315, 317.)

11. 

Is the dashed line a line of symmetry? Write Yes or No. (See pp. 316, 320–321.)

12. 

Find the perimeter. Find the volume in cubic units. (See pp. 322–325.)

13. 

14. 

15. 

(See Still More Practice, p. 466.)
Complex Solid Figures

You can combine solid figures to make new figures.

A rectangular prism and four cylinders combine to make the table you see.

This entrance gate is made by combining four cubes and a pyramid.

Problem Solving

1. What solid figure do you need to combine with the figure on the left to make the figure on the right?

2. What solid figures do you need to combine with the figure shown to make legs on a bench?

3. What solid figures do you need to combine to make the figure shown?

4. Work with a partner. Each of you should use solid figures to build your own complex figure. Use as many solids as you wish. Use your imagination, too! Then look at each other’s figures. Try to build one exactly like it. Describe and discuss what you do.
Chapter 9 Test

Name the figure. Then tell how many sides or edges, faces, and vertices each has.

1. \[ \text{pentagon} \]
2. \[ \text{octagon} \]
3. \[ \text{cylinder} \]
4. \[ \text{cube} \]

Draw each.

5. \[ \text{ray} \]
6. \[ \text{perpendicular lines} \]
7. \[ \text{acute angle} \]

Write the ordered pairs.

8. \[ \begin{array}{cccc}
A & B & C & D \\
1 & 2 & 3 & 4 \\
2 & 3 & 4 & 5 \\
3 & 4 & 5 & 6 \\
4 & 5 & 6 & 7 \\
\end{array} \]

Is the dashed line a line of symmetry? Write Yes or No.

9. \[ \text{Yes} \]

Find the area in square units.

10. \[ \text{rectangle} \]

Find the volume in cubic units.

11. \[ \text{triangle} \]

Problem Solving

Use a strategy you have learned.

14. A quilt has 9 squares across and 4 squares down. How many squares are in the quilt?

15. Draw 2 congruent triangles. Double each side of one triangle. Is the new triangle similar or congruent? Explain.

Performance Assessment

16. Draw a trapezoid. Describe the figure.
### Test Preparation

**Choose the best answer.**

1. $7 \times 7$
   - a. 0
   - b. 14
   - c. 49
   - d. 56

2. Choose the ordered pair for $L$.
   - ![Grid with points O, G, L, E, and N labeled]
   - a. (4, 2)
   - b. (4, 3)
   - c. (5, 2)
   - d. (5, 5)

3. Which is 2550 more than 3680?
   - a. 623
   - b. 1130
   - c. 5230
   - d. 6230

4. How much time is between 10:30 A.M. and 2:00 P.M.?
   - a. 3 hours
   - b. 3 hours, 30 minutes
   - c. 4 hours
   - d. 8 hours, 30 minutes

5. $8\sqrt{40}$
   - a. 2
   - b. 5
   - c. 6
   - d. not given

6. $3 \times 8 \times 3$
   - a. 14
   - b. 63
   - c. 72
   - d. 383

7. Find the perimeter.
   - ![Rectangle with dimensions 2 cm x 7 cm]
   - a. 9 cm
   - b. 14 cm
   - c. 16 cm
   - d. 18 cm

8. $9\sqrt{0}$
   - a. 0
   - b. 1
   - c. 9
   - d. 10

9. Which is a polygon?
   - ![Hexagon, Cylinder, and Circle labeled]
   - a. A
   - b. B
   - c. C
   - d. none of these

10. Which gives an answer that is less than 400?
    - a. $500 - 46$
    - b. $800 - 350$
    - c. $900 - 479$
    - d. $700 - 302$

11. $204 + 19 + 596 + 313$
    - a. 1022
    - b. 1122
    - c. 1132
    - d. 1303

12. $\begin{array}{c}$60.02
      \hline
      -34.16
      \end{array}$
    - a. $26.96$
    - b. $35.86$
    - c. $94.18$
    - d. not given

13. Which of the following holds about 10 liters of water?
    - a. a baby’s bottle
    - b. an eyedropper
    - c. a fish tank
    - d. a pool

14. How many square units are there?
    - ![Grid of squares labeled]
    - a. 24
    - b. 25
    - c. 29
    - d. 34
15. Find the missing factor.
   \[ ? \times 2 = 16 \]
   a. 8  
   b. 10  
   c. 14  
   d. 18  

16. \( 6 \div 1 \)
   a. 1  
   b. 5  
   c. 6  
   d. 7  

19. What tool would you use to find the weight of a dog?
   a. meterstick  
   b. scale  
   c. inch ruler  
   d. none of these  

20. Which fact is part of the fact family for 4, 8, and 32?
   a. \( 4 + 4 = 8 \)  
   b. \( 32 - 8 = 24 \)  
   c. \( 24 \div 4 = 6 \)  
   d. \( 8 \times 4 = 32 \)  

21. What is shown below?
   a. a line  
   b. a line segment  
   c. a ray  
   d. none of these  

22. How many right angles does a square have?
   a. 1  
   b. 2  
   c. 3  
   d. 4  

23. There are 1538 students at Abby’s school. Alexa’s school has 698 fewer students than Abby’s school. How many students go to Alexa’s school?
   a. 940  
   b. 1160  
   c. 2236  
   d. not given  

24. Find the mode, median, and range for the data shown in the line plot in question 17.  

25. Ms. Spellman took her class of 30 students to the beach. Six teams of 4 students each played volleyball. The others went swimming. How many students went swimming?
In this chapter you will:
Estimate products
Explore multiplication with regrouping
Solve problems by working backward

Critical Thinking/Finding Together
Carlos needs to know about how many beans are in the jar to win a contest. Explain a strategy that Carlos can learn to estimate the number of beans in the jar.

Things You Don’t Need to Know
Don’t test a rattlesnake’s rattle.
Don’t count the teeth of a shark.
Don’t stick your head in the mouth of a bulldog to find out what’s making him bark.
Don’t count the stripes on a tiger.
Don’t squeeze an elephant’s trunk.
Don’t pet the scales of a boa constrictor and don’t lift the tail of a skunk.
Don’t inspect spots on a leopard.
Don’t check the charge of an eel.
Don’t count the claws on a grizzly bear’s paws regardless of how brave you feel.

Try to learn all that you’d like to.
Study wherever you go.
Take my advice, though, and never forget there are some things you don’t need to know.

Kenn Nesbitt
Multiplication Patterns

You can use basic facts and patterns of zero to multiply tens, hundreds, and thousands mentally.

- Write the product of the basic fact.
- Count the number of zeros in the factors.
- Then write the same number of zeros in the product.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 x 2</td>
<td>12</td>
</tr>
<tr>
<td>6 x 20</td>
<td>120</td>
</tr>
<tr>
<td>6 x 200</td>
<td>1200</td>
</tr>
<tr>
<td>6 x 2,000</td>
<td>12,000</td>
</tr>
</tbody>
</table>

- 5 x 6 = 30
- 5 x 60 = 300
- 5 x 600 = 3000
- 5 x 6,000 = 30,000

Use a basic fact and patterns to find each product.

1. 2 x 9 = ?
   - 2 x 90 = ?
   - 2 x 900 = ?
   - 2 x 9,000 = ?

2. 4 x 5 = ?
   - 4 x 50 = ?
   - 4 x 500 = ?
   - 4 x 5,000 = ?

3. 6 x 8 = ?
   - 6 x 80 = ?
   - 6 x 800 = ?
   - 6 x 8,000 = ?

4. 3 x 7 = ?
   - 3 x 70 = ?
   - 3 x 700 = ?
   - 3 x 7,000 = ?

5. 9 x 4 = ?
   - 9 x 40 = ?
   - 9 x 400 = ?
   - 9 x 4,000 = ?

6. 5 x 8 = ?
   - 5 x 80 = ?
   - 5 x 800 = ?
   - 5 x 8,000 = ?

Find each product.

7. 2 x 50
8. 4 x 600
9. 7 x 30
10. 4 x 8,000

11. 3 x 90
12. 8 x 200
13. 4 x 4,000
14. 9 x 60

15. 8 x 700
16. 3 x 500
17. 9 x 8,000
18. 6 x 700

19. 5 x 400
20. 7 x 7,000
21. 2 x 6,000
22. 8 x 5,000
Use a basic fact and patterns to find each product.

23. $5 \times 9 = ?$
   \hspace{1cm} 24. $7 \times 5 = ?$
   \hspace{1cm} 25. $8 \times 8 = ?$
   $5 \times 90 = ?$
   \hspace{1cm} $7 \times 50 = ?$
   \hspace{1cm} $8 \times 80 = ?$
   $5 \times 900 = ?$
   \hspace{1cm} $7 \times 500 = ?$
   \hspace{1cm} $8 \times 800 = ?$
   $5 \times 9,000 = ?$
   \hspace{1cm} $7 \times 5,000 = ?$
   \hspace{1cm} $8 \times 8,000 = ?$

Find each product.

26. $3 \times 60$
27. $4 \times 7,000$
28. $6 \times 90$
29. $8 \times 6,000$
30. $7 \times 90$
31. $9 \times 300$
32. $2 \times 8,000$
33. $9 \times 90$
34. $8 \times 400$
35. $3 \times 2,000$
36. $9 \times 5,000$
37. $5 \times 700$
38. $6 \times 4,000$
39. $7 \times 800$
40. $8 \times 9,000$
41. $9 \times 7,000$

Problem Solving

42. John makes 300 copies of 2 different posters for the school play. How many copies does he make?

43. Sam makes 80 stars in each of three colors, yellow, green, and blue. How many stars does Sam make?

44. Mr. Jones orders 3,000 copies of 6 books and 2,000 copies of 4 books for his store. How many copies does he order in all?

45. Ms. Green orders 3,000 baseballs for each of her 4 stores on the east coast and 6,000 for each of her 7 stores on the west coast. How many baseballs does she order?

TEST PREPARATION

46. What is the product of $9 \times 900$?
   \hspace{1cm} A 81 \hspace{1cm} B 810 \hspace{1cm} C 8100 \hspace{1cm} D 81,000
About how much do 4 binders cost?

An estimate tells about how much or about how many.

To find about how much 4 binders cost, estimate: \( 4 \times 5.75 = ? \).

Here are two ways to estimate the product.

**Rounding:** Round the greater factor to its greatest place value. Then multiply.

\[
\begin{align*}
5.75 & \quad \text{about} \quad 6.00 \\
\times 4 & \quad \times 4 \\
\text{about} & \quad \text{about} \quad 24.00
\end{align*}
\]

Remember: Write the dollar sign and the decimal point.

**Front-End Estimation:** Use the value of the front digit of the greater factor. Then multiply.

\[
\begin{align*}
5.75 & \quad \text{about} \quad 5.00 \\
\times 4 & \quad \times 4 \\
\text{about} & \quad \text{about} \quad 20.00
\end{align*}
\]

4 binders cost between $20.00 and $24.00.

Study these examples.

<table>
<thead>
<tr>
<th>Round to the nearest hundred.</th>
<th>328</th>
<th>300</th>
<th>Round to the nearest ten.</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \times 5 )</td>
<td>( \times 5 )</td>
<td>about 1500</td>
<td>( \times 3 )</td>
<td>( \times 3 )</td>
<td>about 210</td>
</tr>
</tbody>
</table>

Multiply mentally. Describe any pattern you see.

1. \( 2 \times 20 \) 2. \( 2 \times 30 \) 3. \( 2 \times 40 \) 4. \( 2 \times 50 \) 5. \( 2 \times 60 \)

6. \( 6 \times 100 \) 7. \( 6 \times 200 \) 8. \( 6 \times 300 \) 9. \( 6 \times 400 \) 10. \( 6 \times 500 \)
Estimating to the Nearest Ten Cents

Estimate: 3 × 28¢
- Use rounding:

28¢ → 30¢
× 3
about 90¢

Remember: 90¢ = $.90

Estimate: 8 × $.22
- Use front-end estimation:

$.22 → $.20
× 8
about $1.60

Remember: $1.60 = 160¢

Estimate. First round, then use front-end estimation.

11. 17 × 4
12. 73 × 8
13. 11¢ × 5
14. $.26 × 2
15. $.88 × 3
16. 135 × 6
17. 274 × 3
18. $3.48 × 2
19. $8.09 × 4
20. $6.77 × 4

21. 3 × 35
22. 2 × 14
23. 3 × $.39
24. 5 × $.48

25. 7 × 757
26. 3 × 522
27. 5 × $5.98
28. 4 × $5.79

Problem Solving

Use the sale items on page 338.

29. Ms. Li bought 3 gym bags at the sale. About how many dollars did she spend?

30. Jacinta bought a half dozen rulers. About how much money did she spend?

Critical Thinking

The exact product for exercise 28 is $23.16.

31. Look at your estimates for exercise 28. Which method resulted in an estimate that was greater than the exact product? Explain why.

32. Which method resulted in an estimate that was less than the exact product? Why?
Multiply Two Digits

Kindra has 2 sheets of stamps. Each sheet has 24 stamps. How many stamps does Kindra have?

First estimate the product by rounding:

\[
\begin{array}{c c c c}
24 & \times & 2 & \rightarrow \\
& & 20 & \rightarrow \\
& \times & 2 & \rightarrow \\
& & 40 & \rightarrow \\
\end{array}
\]

To find how many stamps Kindra has, multiply: \(2 \times 24 = \_\_\_\_\_\).

Multiply the ones by 2.

\[
\begin{array}{c c}
\text{tens} & \text{ones} \\
2 & 4 \\
\times & 2 \\
8 & \\
\end{array}
\]

\(2 \times 4 \text{ ones} = 8 \text{ ones}
Write 8 in the ones place.

Multiply the tens by 2.

\[
\begin{array}{c c}
\text{tens} & \text{ones} \\
2 & 4 \\
\times & 2 \\
4 & 8 \\
\end{array}
\]

\(2 \times 2 \text{ tens} = 4 \text{ tens}
Write 4 in the tens place.

Kindra has 48 stamps.

Multiply mentally.

1. Multiply 10 by: 3, 7, 8, 2, 9, 4, 5, 6
2. Multiply 20 by: 1, 3, 6, 2, 5, 8, 7, 4, 9

Estimate by rounding. Then multiply.

3. \(11 \times 6\)
4. \(12 \times 2\)
5. \(21 \times 4\)
6. \(11 \times 8\)
7. \(12 \times 3\)
Multiply.

8. \[ \frac{33}{3} \times 3 \]
9. \[ \frac{23}{2} \times 2 \]
10. \[ \frac{23}{3} \times 3 \]
11. \[ \frac{40}{2} \times 2 \]
12. \[ \frac{13}{2} \times 2 \]
13. \[ \frac{22}{4} \times 4 \]
14. \[ \frac{32}{3} \times 3 \]
15. \[ \frac{34}{2} \times 2 \]
16. \[ \frac{13}{3} \times 3 \]
17. \[ \frac{31}{2} \times 2 \]
18. \[ \frac{41}{2} \times 2 \]
19. \[ \frac{21}{3} \times 3 \]
20. \[ \frac{32}{2} \times 2 \]
21. \[ \frac{43}{2} \times 2 \]
22. \[ \frac{22}{3} \times 3 \]

Align. Then find the product.

23. \[ 3 \times 31 \]
24. \[ 2 \times 33 \]
25. \[ 2 \times 42 \]
26. \[ 3 \times 30 \]
27. \[ 2 \times 22 \]
28. \[ 9 \times 11 \]
29. \[ 2 \times 30 \]
30. \[ 2 \times 44 \]

Problem Solving

31. Liam mounts stamps on pages. Each page has 12 stamps. How many stamps are on 4 pages?

32. Chau collects coins. She has 2 sheets. Each sheet has 24 coins. How many coins does she have in all?

DO YOU REMEMBER?

33. Are these figures congruent?
34. Are these lines perpendicular?
35. How many angles does this figure have?
Materials: base ten blocks, record sheet

Step 1: First estimate the product.

Step 2: Model 3 groups of 14.

Step 3: Combine the groups.
How many ones and tens do you have altogether?

Step 4: Regroup ones as tens.
How many ones did you regroup as tens?
How many ones and tens do you have now?

Write the number in standard form that represents your model.

What is the product of $3 \times 14$?

Is your answer reasonable? Explain.

Use models to find the product of $4 \times 31$.

Step 1: First estimate the product.
Then model 4 groups of 31.
Step 2
Regroup tens as hundreds.
How many ones, tens, and hundreds do you have now?
Write the number in standard form that represents your model.
What is the product of $4 \times 31$?
Is your answer reasonable? Explain.

Which multiplication sentence goes with each model?
Choose the letter of the correct answer.

1.  
   a. $4 \times 12 = 48$
   b. $4 \times 13 = 52$
   c. $3 \times 16 = 48$
   d. $3 \times 13 = 39$

2.  
   a. $3 \times 10 = 30$
   b. $3 \times 12 = 36$
   c. $3 \times 14 = 42$
   d. $3 \times 15 = 45$

Area Model of Multiplication
Multiply: $3 \times 14 = ?$

Factor 14

Factor 3

Product

$3 \times 14 = 42$

Use your base ten blocks to show each model. Then complete.

3.  
   $6 \times 12 = ?$

4.  
   $8 \times 14 = ?$

5. Which method of multiplication is easier for you? Explain your answer.
Multiply with Regrouping

Jamal buys 6 packs of postcards. Each pack has 12 postcards. How many postcards does he buy?

First estimate the product by rounding: \( 6 \times 10 = 60 \)

Then to find the number of postcards, multiply: \( 6 \times 12 = ? \).

Multiply the ones. Regroup.

Multiply the tens. Then add the 1 ten.

\[
\begin{array}{c}
1 \\
1 2 \\
\times 6 \\
\hline
2 \\
\end{array}
\quad \begin{array}{c}
1 \\
1 2 \\
\times 6 \\
\hline
7 2 \\
\end{array}
\]

6 \times 2 \text{ ones} = 12 \text{ ones}
12 \text{ ones} = 1 \text{ ten}

6 \times 1 \text{ ten} = 6 \text{ tens}
6 \text{ tens plus 1 ten} = 7 \text{ tens}

Jamal buys 72 postcards.

Study these examples.

\[
\begin{array}{c}
2 \\
29\, \text{¢} \\
\times 3 \\
\hline
87\, \text{¢} \\
\end{array}
\quad \begin{array}{c}
3 \\
$19 \\
\times 4 \\
\hline
$76 \\
\end{array}
\]

Remember: Write the cent sign.
Remember: Write the dollar sign.

Multiply.

1. \( 16\, \text{¢} \times 4 \)
2. \( 27\, \text{¢} \times 2 \)
3. \( $14 \times 6 \)
4. \( $13 \times 7 \)
5. \( $25 \times 3 \)
6. \( 7 \times 14 \)
7. \( 4 \times 19 \)
8. \( 3 \times 24 \)
9. \( 2 \times 28 \)
Use rounding to estimate the product. Then multiply.

10. 15 \times 5
11. 18 \times 4
12. 35 \times 2
13. 29 \times 2
14. 13 \times 6
15. 19 \times 3
16. 38 \times 2
17. 47 \times 2
18. 17 \times 5
19. 12 \times 7

20. 17¢ \times 4
21. 26¢ \times 3
22. $13 \times 5
23. $37 \times 2
24. $15 \times 4

Find the product.

25. 3 \times 18
26. 2 \times 45
27. 4 \times 23
28. 4 \times 14
29. 4 \times 13¢
30. 4 \times 16¢
31. 2 \times 39¢
32. 3 \times 28¢
33. 4 \times $21
34. 3 \times $27
35. 5 \times $18
36. 2 \times $49

Compare. Write <, =, or >.

37. 2 \times 20 \ ? 4 \times 12
38. 5 \times 18 \ ? 3 \times 30

**Problem Solving**

Use the table.

<table>
<thead>
<tr>
<th>Size of Pack</th>
<th>Number in the Pack</th>
<th>Price of Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>12</td>
<td>$1.29</td>
</tr>
<tr>
<td>Medium</td>
<td>24</td>
<td>$1.99</td>
</tr>
<tr>
<td>Large</td>
<td>36</td>
<td>$2.59</td>
</tr>
</tbody>
</table>

39. Chad buys 5 small packs. How many postcards does he buy?
40. Leah buys 2 large packs. How many postcards does she buy?
41. Sara buys 4 medium packs. About how much money does she spend?

**Challenge**

42. How many ways are there to buy 48 postcards? Write a multiplication or an addition sentence for each way. Share your ways with classmates.
43. Which is the cheapest way to buy 48 postcards?
A truck travels 43 miles on the same route each day. How many miles does the truck travel in 3 days?

First estimate the product: $3 \times 43 = ?$

Use rounding.

$3 \times 40 = 120$

Then to find the number of miles, multiply: $3 \times 43 = ?$.

Multiply the ones. Multiply the tens. Regroup.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>$\times$ 3</td>
<td>$\times$ 3</td>
</tr>
<tr>
<td>9</td>
<td>129</td>
</tr>
</tbody>
</table>

$3 \times 3$ ones = 9 ones
$3 \times 4$ tens = 12 tens
12 tens = 1 hundred 2 tens

The truck travels 129 miles in 3 days.

Sometimes you need to regroup twice.

Multiply: $5 \times 37 = ?$

Multiply the ones. Multiply the tens. Then add the 3 tens. Regroup again.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>$\times$ 5</td>
<td>$\times$ 5</td>
</tr>
<tr>
<td>5</td>
<td>185</td>
</tr>
</tbody>
</table>

$5 \times 7$ ones = 35 ones
35 ones = 3 tens 5 ones
$5 \times 3$ tens = 15 tens
15 tens + 3 tens = 18 tens
18 tens = 1 hundred 8 tens
Use rounding to estimate the product. Then multiply.

1. \(41 \times 3\)  
2. \(52 \times 4\)  
3. \(40 \times 7\)  
4. \(63 \times 3\)  
5. \(54 \times 2\)  

6. \(21 \times 6\)  
7. \(31 \times 5\)  
8. \(62 \times 3\)  
9. \(71 \times 8\)  
10. \(51 \times 4\)  

11. \(47 \times 5\)  
12. \(23 \times 4\)  
13. \(74 \times 8\)  
14. \(37 \times 6\)  
15. \(64 \times 7\)  

16. \(23 \times 9\)  
17. \(37 \times 4\)  
18. \(75 \times 3\)  
19. \(78 \times 2\)  
20. \(94 \times 5\)  

21. \(27 \times 3\)  
22. \(42 \times 7\)  
23. \(43 \times 8\)  
24. \(35 \times 6\)  
25. \(86 \times 4\)  

Problem Solving

Use the chart.

26. How far can a compact car travel on 5 gallons of gas?

27. How far can a mid-size car travel on 8 gallons of gas?

28. A sports car has 5 gallons of gas in its tank. A truck has 7 gallons. Which vehicle can travel farther? How much farther?

Miles Per Gallon of Gas

<table>
<thead>
<tr>
<th>Car Type</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact car</td>
<td>28</td>
</tr>
<tr>
<td>Mid-size car</td>
<td>24</td>
</tr>
<tr>
<td>Sports car</td>
<td>22</td>
</tr>
<tr>
<td>Truck</td>
<td>18</td>
</tr>
</tbody>
</table>

Write About It

Solve. Use paper and pencil or mental math. Tell why you chose the method you used.

29. \(8 \times 30\)  
30. \(8 \times 34\)  
31. \(2 \times 70\)  
32. \(4 \times 22\)  

33. \(5 \times 73\)  
34. \(9 \times 50\)  
35. \(6 \times 67\)  
36. \(3 \times 49\)
10-7

Multiply Three Digits

Terrell and Tom collect seashells. Terrell has 123 shells. Tom has twice that many. How many shells does Tom have?

First estimate the product: $2 \times 123 = \text{?}$

Use rounding.

$2 \times 100 = 200$

Then to find the number of shells, multiply: $2 \times 123 = \text{?}$.

Multiply the ones. Multiply the tens. Multiply the hundreds.

$1 \quad 2 \quad 3$
$\times \quad 2$
$\quad \quad \quad 6$

$2 \times 3 \text{ ones} = 6 \text{ ones}$

$1 \quad 2 \quad 3$
$\times \quad 2$
$\quad \quad \quad 4 \quad 6$

$2 \times 2 \text{ tens} = 4 \text{ tens}$

$1 \quad 2 \quad 3$
$\times \quad 2$
$\quad \quad \quad 2 \quad 4 \quad 6$

$2 \times 1 \text{ hundred} = 2 \text{ hundreds}$

Tom has 246 shells.

Think

246 is close to 200. The answer is reasonable.

Use rounding to estimate. Then multiply.

1. $422 \times 2$
2. $132 \times 3$
3. $102 \times 4$
4. $343 \times 2$
5. $122 \times 4$
6. $401 \times 2$
7. $111 \times 5$
8. $231 \times 3$
9. $144 \times 2$
10. $320 \times 2$
11. $110 \times 6$
12. $121 \times 4$
13. $101 \times 7$
14. $431 \times 2$
15. $332 \times 3$
16. $202 \times 3$
17. $123 \times 2$
18. $333 \times 3$
19. $111 \times 2$
20. $444 \times 2$
Multiplying Four Digits

Multiply the ones.  Multiply the tens.  Multiply the hundreds.  Multiply the thousands.

\[
\begin{array}{cccc}
2 & 3 & 4 & 3 \\
\times & 2 & & \\
\hline & 6 & & \\
\end{array}
\quad \begin{array}{cccc}
2 & 3 & 4 & 3 \\
\times & 2 & & \\
\hline & 8 & 6 & \\
\end{array}
\quad \begin{array}{cccc}
2 & 3 & 4 & 3 \\
\times & 2 & & \\
\hline & 6 & 8 & 6 \\
\end{array}
\quad \begin{array}{cccc}
2 & 3 & 4 & 3 \\
\times & 2 & & \\
\hline & 4 & 6 & 8 & 6 \\
\end{array}
\]

\[2 \times 2 \text{ thousands} = 4 \text{ thousands}\]

Multiply.

21. \[1313 \times 3\]

22. \[3424 \times 2\]

23. \[1111 \times 9\]

24. \[2323 \times 3\]

25. \[2120 \times 4\]

26. \[3321 \times 3\]

27. \[4242 \times 2\]

28. \[3302 \times 3\]

29. \[1110 \times 7\]

30. \[2102 \times 3\]

Compare. Write <, =, >.

31. \[2 \times 122 \_ 2 \times 102\]

32. \[3 \times 131 \_ 3 \times 231\]

33. \[4 \times 111 \_ 3 \times 111\]

34. \[2 \times 2212 \_ 2 \times 2214\]

35. \[3 \times 3303 \_ 3 \times 2223\]

36. \[3 \times 2203 \_ 2 \times 2202\]

Problem Solving

37. Jason made 212 free-throw shots. Craig made 3 times as many shots. How many shots did Craig make?

38. Dong made 131 free throws on each of three days. How many throws did Dong make in all?
A certain type of plane has 224 seats. How many seats do 3 planes have?

- First round to estimate: \(3 \times 200 = 600\)
- Then to find the number of seats, multiply: \(3 \times 224 = \_\_\_.\)

Three planes have 672 seats.

**Study this example.**

Sometimes you need to regroup tens.

Multiply: \(3 \times 273 = \_\_\_.\)
Use rounding to estimate the product. Then multiply.

1. 238 \times 2
2. 112 \times 5
3. 102 \times 8
4. 218 \times 4
5. 325 \times 3

6. 105 \times 7
7. 127 \times 2
8. 107 \times 9
9. 437 \times 2
10. 102 \times 6

11. 242 \times 3
12. 131 \times 6
13. 192 \times 4
14. 253 \times 3
15. 121 \times 7

16. 182 \times 4
17. 121 \times 8
18. 150 \times 6
19. 142 \times 3
20. 493 \times 2

Regrouping with Four Digits

Multiply the ones. Regroup.
Multiply the tens. Add the regrouped ones.
Multiply the hundreds. Then multiply thousands.

\[
\begin{array}{c}
1 & 2 & 1 & 3 \\
\times & 4 \\
\hline
4 & 2 \\
\end{array}
\quad \begin{array}{c}
1 & 2 & 1 & 3 \\
\times & 4 \\
\hline
4 & 8 & 5 & 2 \\
\end{array}
\quad \begin{array}{c}
1 & 2 & 1 & 3 \\
\times & 4 \\
\hline
4 & \times 1213 = 4852 \\
\end{array}
\]

4 \times 3 \text{ ones} = 12 \text{ ones} = 1 \text{ ten 2 ones}

Find the product.

21. 1113 \times 5
22. 3126 \times 2
23. 1025 \times 3
24. 1417 \times 2

25. 3251 \times 3
26. 2263 \times 2
27. 1070 \times 4
28. 2042 \times 4
Ted sells 5 couches. How much money does he get?

First round to estimate:

5 \times $1000 = $5000

Then to find how much money he gets, multiply: 5 \times $1129 = ?.

Multiply the ones. Regroup.

\[
\begin{array}{c}
\text{5} \\
\times 5 \\
\hline
\end{array}
\]

5 \times 9 \text{ ones} = 45 \text{ ones}

= 4 \text{ tens} 5 \text{ ones}

Multiply the hundreds. Add the regrouped hundred.

\[
\begin{array}{c}
1 4 \\
\times 5 \\
\hline
6 4 5 \\
\end{array}
\]

5 \times 1 \text{ hundred} = 5 \text{ hundreds}

5 \text{ hundreds} + 1 \text{ hundred} = 6 \text{ hundreds}

Ted gets $5645.

Multiply the tens. Add the regrouped ten. Regroup again.

\[
\begin{array}{c}
1 4 \\
\times 5 \\
\hline
4 5 \\
\end{array}
\]

Multiply the thousands.

\[
\begin{array}{c}
1 4 \\
\times 5 \\
\hline
5 6 4 5 \\
\end{array}
\]

Think

$5645$ is close to $5000$. The answer is reasonable.
Round to estimate the product. Then multiply.

1. \(355 \times 2\)  
2. \(247 \times 4\)  
3. \(\$153 \times 5\)  
4. \(\$499 \times 2\)  
5. \(122 \times 6\)  
6. \(2248 \times 3\)  
7. \(1128 \times 7\)  
8. \(2224 \times 4\)  
9. \(1113 \times 8\)  
10. \(1134 \times 5\)  
11. \(\$135 \times 7\)  
12. \(\$158 \times 6\)  
13. \(\$1172 \times 5\)  
14. \(\$3386 \times 2\)  
15. \(\$2243 \times 4\)  

Find the product.

16. \(235 \times 4\)  
17. \(141 \times 7\)  
18. \(3239 \times 3\)  
19. \(1106 \times 8\)  
20. \(303 \times 2\)  
21. \(256 \times 3\)  
22. \(2164 \times 4\)  
23. \(117 \times 8\)  
24. \(\$137 \times 6\)  
25. \(\$1105 \times 5\)  

Problem Solving

Use the chart on page 352.

26. Kari buys 3 desks at Ted’s. How much money does she spend?

27. Ted sells 2 cabinets. How much money does he get?

28. Bryant buys 2 bookcases. How much money does he spend?

29. Ted sells 3 couches. How much money does he get?

30. Colin has \(\$900\). Does he have enough money for 3 tables? If so, how much extra money does he have? If not, how much more money does he need?

31. Wayne has \(\$1600\). Does he have enough money for 2 tables and 1 couch? If so, how much extra money does he have? If not, how much more money does he need?
The librarian got a box full of new books. Gina gave her 4 more books. They put 9 books on the shelf. There are now 12 books left in the box. How many new books were in the box?

**Read**

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

**Facts:**
- 4 books from Gina
- 9 books on the shelf
- 12 books left

**Question:** How many new books were in the box?

**Plan**

To find how many books were in the box at the beginning, start at the end and work backward.

\[
\begin{align*}
12 & + 9 - 4 = ? \\
\text{books} & \quad \text{books} & \quad \text{books} & \quad \text{new books}
\end{align*}
\]

\[
\begin{align*}
\text{left} & \quad \text{on shelf} & \quad \text{not in box} & \quad \text{in box}
\end{align*}
\]

**Solve**

\[
\begin{align*}
12 & + 9 = 21 \quad \text{total number of books} \\
21 & - 4 = 17 \quad \text{number of new books in the box}
\end{align*}
\]

There were 17 new books in the box.

**Check**

Work from the beginning to check.

\[
\begin{align*}
17 & + 4 = 21 \quad \text{and} \quad 21 & - 9 = 12 \\
\text{number} & \quad \text{number} & \quad \text{number}
\end{align*}
\]

\[
\begin{align*}
\text{in box} & \quad \text{from Gina} & \quad \text{on shelf} & \quad \text{left}
\end{align*}
\]
Work backward to solve each problem.

1. Phil finished his research paper at 4:00 after working on it for 3 hours. What time did he begin?

   **Facts:** Phil worked until 4:00. He worked for 3 hours.

   **Question:** What time did he begin?

2. Maria worked in the library until 3:30. She spent 1 hour on a research paper, 45 minutes returning books to shelves, and 15 minutes making copies. What time did she begin?

3. The library closes at 8:00 P.M. If it is open for nine hours each day, what time does the library open?

4. Kyle’s 3-day book sale made a total of $684. Today he made $252. Yesterday he made $197. How much money did he make the first day?

5. Right now Karen has 15 books. When she first began a library, her friend gave her 8 books, she bought 1 book, and she lost 2 books. How many books did she have at first in her library?
Problem-Solving Applications: Mixed Review

Solve each problem and explain the method you used.

1. A toy store gets 3 cartons of stuffed bears. Each carton has 20 stuffed bears. How many stuffed bears did the store get?

2. A salesperson sold 4 bicycles. Each bicycle sold for $123. Did the salesperson make more or less than $800?

3. Adam has 9 pieces of train track. Each piece is 32 centimeters long. How long will the entire track be when he connects all 9 pieces?

4. Ms. Shaw bought 5 games for her family. She spent $12.59 for each game. About how much money did she spend for the games?

5. Brent goes a distance of 23 inches with each hop on his pogo stick. At this rate how many inches can Brent go in 6 hops? Will he beat Ellen, who can go 120 inches in 6 hops?

6. Lori made 7 bracelets. She used 22 beads on each. Faith used 31 beads on each of the 5 bracelets that she made. Which girl used more beads? How many more beads did she use?

7. A toy factory makes 38 electronic games every hour. At this rate how many games will the factory make in 7 hours?

8. Sue and each of the twins buy roller skates. Each pair costs $25.39. About how much money do the girls pay altogether?
Choose a strategy from the list or use another strategy you know to solve each problem.

9. Ms. Leone makes toy keyboards. Each of them has a dozen black keys and 17 white keys. How many keys of each color does she need for 5 keyboards?

10. Raisa and her two friends want to buy the same jewelry kits. About how much money will each girl pay if the total cost will be $23.67?

11. Chris arranged his models on a shelf in left-to-right order. The spaceship is to the left of the truck. The truck is not next to the boat. The jet is the fourth model. Which model is second?

12. A jigsaw puzzle of the United States has 7 red-colored states and twice as many green-colored states. There are 5 more yellow- than orange-colored states. How many states are colored green? yellow? orange?

13. Marsha bought a pack of colored felt. She loaned 5 pieces to Russ. Then Laura gave Marsha 3 pieces. After Marsha used 4 pieces, she had 6 pieces left. How many pieces of felt were in the pack Marsha bought?

14. Altogether four children collected 54 toys for the hospital. Liz collected a dozen. Randy, Carla, and Angie collected an equal number of toys. How many toys did Carla collect?

15. Write a problem. Have a classmate solve it.
Check Your Progress
Lessons 1–11

Estimate. First round, then use front-end estimation. (See pp. 338–339.)

1. 59 \times 3
2. 62 \times 2
3. 273 \times 6
4. 38\cent \times 8
5. $6.04 \times 9

Multiply. (See pp. 336–337, 340–341, 344–353.)

6. 21 \times 4
7. 32 \times 3
8. 14\cent \times 2
9. 53 \times 8
10. 65 \times 6
11. $29 \times 2
12. $87 \times 7
13. 224 \times 2
14. 113 \times 4
15. 200 \times 3
16. $164 \times 5
17. $106 \times 9
18. 1322 \times 2
19. 2000 \times 3
20. 3256 \times 2

Align. Then find the product.

21. 2 \times 40
22. 9 \times 16
23. 3 \times 138
24. 4 \times 1209

Compare. Write <, =, or >.

25. 4 \times 111 \neq 3 \times 121
26. 2 \times 404 > 3 \times 303

Problem Solving

27. Joseph has 15 coins in a box. Andrew has 4 times as many. How many coins does Andrew have?

28. A movie theater ticket costs $7.75. About how much does it cost for 3 people to go to the movies?

29. Dad bought a puzzle for Mona and a puzzle for Jim. The puzzles cost $9.89 each. About how much did Dad spend?

30. Mona and Jim finished one of the puzzles at 9:30, after working on it for 4 hours. What time did they begin?
Logic and Missing Digits

Someone ate Lady Snoot’s strawberries. Lady Snoot thinks the culprit was either the maid, the cook, or the butler. Can you help her solve this mystery?

Be a detective. Follow the steps below and you will find the culprit.

1. Find the missing digits.

2. Look at the code at the bottom of the page. Each missing digit has a matching letter.

3. Write the letters in the order of the exercises to find “whodunit.”

1. \[ \begin{array}{c} \text{2}6 \\ \times \text{5} \end{array} \]
   \[ \begin{array}{c} \text{1} \text{3} \text{0} \end{array} \]

2. \[ \begin{array}{c} \text{3} \Box \text{8} \\ \times \text{2} \end{array} \]
   \[ \begin{array}{c} \text{6} \text{1} \text{6} \end{array} \]

3. \[ \begin{array}{c} \text{1} \text{2} \text{9} \\ \times \Box \end{array} \]
   \[ \begin{array}{c} \text{5} \text{1} \text{6} \end{array} \]

4. \[ \begin{array}{c} \text{1} \text{5} \Box \\ \times \text{3} \end{array} \]
   \[ \begin{array}{c} \text{4} \text{7} \text{1} \end{array} \]

5. \[ \begin{array}{c} \Box \text{2} \\ \times \text{9} \end{array} \]
   \[ \begin{array}{c} \text{7} \text{3} \text{8} \end{array} \]

6. \[ \begin{array}{c} \text{2} \text{7} \text{9} \\ \times \Box \end{array} \]
   \[ \begin{array}{c} \text{8} \text{3} \text{7} \end{array} \]

<table>
<thead>
<tr>
<th>Missing Digit</th>
<th>0</th>
<th>7</th>
<th>2</th>
<th>4</th>
<th>3</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter</td>
<td>E</td>
<td>D</td>
<td>H</td>
<td>R</td>
<td>G</td>
<td>O</td>
</tr>
</tbody>
</table>

7. Write a mystery. Then make up exercises and a code to solve the mystery.
Chapter 10 Test

Round to estimate the product. Then multiply.

1. $44 \times 2$
2. $13 \times 3$
3. $10 \times 9$
4. $12\text{¢} \times 4$
5. $24\text{¢} \times 2$

6. $19 \times 5$
7. $26 \times 3$
8. $74 \times 4$
9. $47 \times 6$
10. $63 \times 8$

11. $123 \times 3$
12. $327 \times 2$
13. $190 \times 3$
14. $179 \times 4$
15. $207 \times 4$

Align. Then find the product.

16. $3 \times 30$
17. $2 \times 171$
18. $4 \times 203$

19. $2 \times 2443$
20. $2 \times 4306$
21. $3 \times 3197$

Problem Solving

Use a strategy you have learned.

22. There are 7 students in a group. There are 14 groups. How many students are there in all?

23. Ryan bought 8 rolls of film. The film cost $3.98 a roll. About how much money did he pay for the film?

Tell About It

24. Find each product. Explain the pattern in the products.

- $7 \times 2 = ?$
- $7 \times 20 = ?$
- $7 \times 200 = ?$
- $7 \times 2000 = ?$

Performance Assessment

Estimate.

25. You have $200 to spend on science materials for your classroom. Use estimation to decide how to spend the money. What would you buy?

<table>
<thead>
<tr>
<th>Material</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software</td>
<td>$34.59 each</td>
</tr>
<tr>
<td>Video</td>
<td>$19.95 each</td>
</tr>
<tr>
<td>Magazine</td>
<td>$4.37 for 1 copy</td>
</tr>
<tr>
<td>Fossil Kit</td>
<td>$44.95 each</td>
</tr>
<tr>
<td>Model</td>
<td>$12.95 each</td>
</tr>
</tbody>
</table>
Test Preparation

Choose the best answer.

1. $16 \div 4$
   a. 4
   b. 5
   c. 12
   d. 20

2. Choose the standard form of the number.
   $30,000 + 600 + 7$
   a. 3,607
   b. 30,607
   c. 30,670
   d. 36,700

3. $5 \times 7000$
   a. 3500
   b. 350
   c. 35
   d. 35,000

4. $4.52 - 2.64$
   a. $1.88$
   b. $2.12$
   c. $2.98$
   d. $7.16$

5. $6 \div 36$
   a. 5
   b. 6
   c. 9
   d. not given

6. Find the volume in cubic units.
   a. 8 cubic units
   b. 9 cubic units
   c. 11 cubic units
   d. 12 cubic units

7. $5 \times 5$
   a. 0
   b. 1
   c. 10
   d. 25

8. How many 1-quart containers can you fill with 8 gallons of water?
   a. 2
   b. 8
   c. 12
   d. 32

9. $234 + 69$
   a. 293
   b. 313
   c. 924
   d. not given

10. $31 \times 3$
    a. 34
    b. 61
    c. 93
    d. not given

11. $36 \times 8$
    a. $44$
    b. $116$
    c. $288$
    d. $2448$

12. What kind of triangle is shown above?
    a. equilateral
    b. isosceles
    c. right
    d. scalene
13. Write the time in standard form.
   7 minutes before 5
   a. 5:07
c. 4:57
d. 7:05

17. How many yards long is a 21-foot long rope?
   a. 3 yd
   b. 7 yd
c. 24 yd
d. 63 yd

14. 9
   × 6
   a. 15
   b. 36
c. 54
d. 63

18. 2127
   × 4
   a. 8408
   b. 8498
c. 8508
d. 84,828

15. How many pies were sold in all?
   a. 11
   b. 22
c. 44
   d. 48

19. How many white socks and blue socks does Anne have altogether?
   a. 12
   b. 16
c. 18
d. 20

16. A store sold 3 TVs for $256 each. How much money did the store get?
   a. $768
   b. $758
c. $668
d. $658

20. Cedric read 40 books in 8 weeks. About how many books did he read each week?
   a. 5
   b. 8
c. 10
d. 40

**Tell About It**

Explain how you solved each problem. Show all your work.

21. Lynn has a pink, a black, and a tan skirt. She also has a white blouse and a black blouse. How many different outfits can she make with a skirt and a blouse?

22. Jean buys 4 packs of pencils. There are 24 pencils in each pack. How many pencils did she buy?
SOS
Sammy’s head is pounding—
Sammy’s in pain—
A long division’s got
Stuck in his brain—
Call for the locksmith
Call the engineer
Call for the plumber
To suck out his ear,
Call the brain surgeon
To pry out the mess,
Call out the Coast Guard
SOS,
Because—
Sammy’s head is pounding—
Sammy’s in pain—
A long division’s got
Stuck in his brain.

Beverly McLoughland

In this chapter you will:
Find 1- and 2-digit quotients
Explore division with remainders
Estimate quotients
Solve problems by interpreting the remainder

Critical Thinking/
Finding Together
List all the division facts that you know. What do you think long division is?
Division Sense

Estimate quotients before you divide.

> **Estimate:** \[34 \div 8 = ?\]. About how many 8s in 34?

When the divisor is greater than the tens digit in the dividend, use multiplication facts to help find the answer.

- 3 ones \(\times 8 = 24\) ones too small
- 4 ones \(\times 8 = 32\) ones
- 5 ones \(\times 8 = 40\) ones too large

So \[34 \div 8\] is about 4.

> **Estimate:** \[76 \div 3 = ?\]. \[?\] tens \(\times 3 = 7\] tens

When the divisor is less than the tens digit in the dividend, use tens to help find the answer.

- 1 ten \(\times 3 = 3\) tens too small
- 2 tens \(\times 3 = 6\) tens
- 3 tens \(\times 3 = 9\) tens too large

Try 2. Write zeros for the other digits. \(3\underline{76}\)

So \[76 \div 3\] is about 20.

Use facts to estimate.

1. \(7 \underline{25}\) 2. \(3 \underline{14}\) 3. \(2 \underline{17}\) 4. \(3 \underline{28}\)
5. \(6 \underline{46}\) 6. \(9 \underline{22}\) 7. \(8 \underline{36}\) 8. \(4 \underline{29}\)
9. \(5 \underline{37}\) 10. \(7 \underline{55}\) 11. \(6 \underline{56}\) 12. \(9 \underline{80}\)
Use tens to estimate.

13. \(2\overline{27}\)  14. \(5\overline{71}\)  15. \(4\overline{92}\)  16. \(7\overline{85}\)
17. \(8\overline{94}\)  18. \(6\overline{79}\)  19. \(3\overline{82}\)  20. \(4\overline{66}\)

Estimate. Explain how you estimated each quotient.

21. \(5\overline{43}\)  22. \(4\overline{51}\)  23. \(6\overline{49}\)  24. \(7\overline{83}\)

Patterns in Division

Look at the pattern.

\[
\begin{align*}
4 \div 2 &= 2 \text{ or } 2\overline{4} \\
40 \div 2 &= 20 \text{ or } 2\overline{40} \\
400 \div 2 &= 200 \text{ or } 2\overline{400}
\end{align*}
\]

Divide mentally.

25. \(6 \div 3 = \) \(8 \div 4 = \)  26. \(8 \div 4 = \)  27. \(9 \div 3 = \)
28. \(8 \div 8 = \)
29. \(60 \div 3 = \)  30. \(80 \div 4 = \)  31. \(90 \div 3 = \)
32. \(80 \div 8 = \)
33. \(600 \div 3 = \)  34. \(800 \div 4 = \)  35. \(900 \div 3 = \)
36. \(800 \div 8 = \)

Find the quotient.

29. \(2\overline{80}\)  30. \(7\overline{70}\)  31. \(3\overline{300}\)  32. \(2\overline{200}\)  33. \(5\overline{50}\)
Mrs. Ming has 15 tickets for rides at the park. They are to be shared equally among her 4 children. At most, how many tickets will each child receive? How many tickets will be left over?

To find how many tickets, divide:  $15 \div 4 = ?$  or  $4 \div 15$

You can use counters to model division.

**Materials:** counters, record sheet, 4 blank sheets of paper

Label the columns on your record sheet with these headings:

<table>
<thead>
<tr>
<th>Dividend (Number of tickets)</th>
<th>Divisor (Number of children)</th>
<th>Quotient (Tickets per child)</th>
<th>Remainder (Tickets left over)</th>
</tr>
</thead>
</table>

**Step 1**
Label the columns on your record sheet with these headings:

**Step 2**
Model 15 counters.
What do the 15 counters represent?

**Step 3**
Place 4 blank sheets of paper on your worktable.
What do the 4 sheets of paper stand for?

**Step 4**
Now place one counter on each sheet of paper.
Do you have enough counters to put more counters on each sheet of paper?
Step 5

Use counters to find out how Mrs. Ming would share the 15 tickets among 2 children, 3 children, and 5 children.

How many counters are on each sheet of paper?
Do you have any counters left over?
How many counters do you have left over?
How many tickets will each child receive?
How many tickets will be left over?

Step 6

Continue to place one counter on each sheet of paper until you can no longer give them out equally.

The number left over after dividing is called the remainder.

Communicate

1. Look at the size of the divisors and the remainders on your record sheet. What do you notice?
2. Explain why there are no remainders when you divide the 15 tickets among 3 and 5 children.
3. Can the remainder in a division sentence ever be larger than the divisor? Explain.

Find the quotient and remainder. Act it out, use counters, or draw dots to show each division.

4. $7 \div 2 = ?$
5. $10 \div 3 = ?$
6. $18 \div 5 = ?$
7. $21 \div 4 = ?$
8. $17 \div 6 = ?$
9. $13 \div 4 = ?$
10. $11 \div 5 = ?$
11. $15 \div 2 = ?$

Problem Solving

12. Tim shares 16 cards equally among 6 boys. At most, how many cards will each boy get? How many will be left over?

13. Mike has 19 tickets. Each ride costs 4 tickets. At most, how many rides can he go on? How many tickets will he have left over?
One-Digit Quotients

Divide: $17 \div 3 = ?$ or $3)17$

- Estimate: About how many 3s in 17?
  
  $4 \times 3 = 12$ too small
  
  $5 \times 3 = 15$ 17 is between 15 and 18. Try 5.
  
  $6 \times 3 = 18$ too large

- Write 5 in the quotient above the 7 ones in the dividend.

Divide.  Multiply.  Subtract and compare.  Write the remainder.

```
5  
3)17  
3 )17  
  15  
```

So $17 \div 3 = 5 R2$.

The remainder must always be less than the divisor.

To check division, use multiplication.

- Multiply the quotient and the divisor.

```
4)27  
4 )24  
  24  
  3  
```

The answer checks.

- Add the remainder.

- The answer should equal the dividend.
Estimate. About how many:

1. 4s in 10?  
2. 3s in 26?  
3. 6s in 39?  
4. 5s in 23?  
5. 2s in 11?  
6. 8s in 15?  
7. 9s in 39?  
8. 7s in 24?

Complete each division.

\[-1 6\]
\[-2 0\]
\[-? 1\]

9. \(2 \div 17\)  
10. \(4 \div 22\)  
11. \(5 \div 33\)  
12. \(6 \div 35\)

Find the quotient and the remainder.

13. \(2 \div 15\)  
14. \(3 \div 14\)  
15. \(4 \div 38\)  
16. \(5 \div 32\)  
17. \(6 \div 56\)

18. \(9 \div 18\)  
19. \(4 \div 17\)  
20. \(5 \div 29\)  
21. \(8 \div 26\)  
22. \(6 \div 28\)

Divide and check.

23. \(5 \div 42\)  
24. \(9 \div 30\)  
25. \(4 \div 25\)  
26. \(5 \div 37\)  
27. \(4 \div 33\)

28. \(9 \div 5 = \_\)  
29. \(15 \div 6 = \_\)  
30. \(41 \div 6 = \_\)  
31. \(37 \div 4 = \_\)

32. \(19 \div 2 = \_\)  
33. \(18 \div 5 = \_\)  
34. \(22 \div 3 = \_\)  
35. \(89 \div 9 = \_\)

Compare. Write \(<, =, \text{or } >\).

36. \(30 \div 7 \bigcirc 75 \div 9\)  
37. \(56 \div 7 \bigcirc 42 \div 8\)  
38. \(52 \div 8 \bigcirc 26 \div 4\)

39. \(45 \div 6 \bigcirc 51 \div 7\)  
40. \(28 \div 3 \bigcirc 47 \div 5\)  
41. \(59 \div 7 \bigcirc 38 \div 6\)

TEST PREPARATION

42. Lou has 13 cards. He sends the same number of cards to each of 6 friends. What is the greatest number of cards he can send to each friend?

A 7  
B 6  
C 3  
D 2
Divide: $96 \div 4 = \underline{?}$ or $4 \overline{)96}$

To find the first digit in the quotient:

- Estimate: \( \underline{?} \) tens $\times$ 4 = 9 tens
  
  - 1 ten $\times$ 4 = 4 tens — too small
  
  - 2 tens $\times$ 4 = 8 tens
  
  - 3 tens $\times$ 4 = 12 tens — too large

9 tens is between 8 tens and 12 tens. Try 2.

Write 2 in the quotient above the 9 tens in the dividend.

Repeat the steps to divide the ones.

To find the second digit in the quotient:

- Estimate: \( \underline{?} \) ones $\times$ 4 = 16 ones
  
  - 4 ones $\times$ 4 = 16 ones — Try 4.

Write 4 in the quotient above the 6 ones in the dividend.

The answer checks.

No remainder
Complete each division.

1. \(2 \div 32\)
   \[\begin{array}{c|cc}
   \hline
   2 & 3 & 2 \\
   \hline
   2 & & 0 \\
   \hline
   0 & 1 & 2 \\
   \hline
   \end{array}\]

2. \(3 \div 39\)
   \[\begin{array}{c|cc}
   \hline
   3 & 3 & 9 \\
   \hline
   3 & & 9 \\
   \hline
   0 & 1 & 2 \\
   \hline
   \end{array}\]

3. \(5 \div 65\)
   \[\begin{array}{c|cc}
   \hline
   5 & 6 & 5 \\
   \hline
   5 & & 0 \\
   \hline
   0 & 1 & 2 \\
   \hline
   \end{array}\]

4. \(4 \div 64\)
   \[\begin{array}{c|cc}
   \hline
   4 & 6 & 4 \\
   \hline
   4 & & 0 \\
   \hline
   0 & 1 & 2 \\
   \hline
   \end{array}\]

Divide and check.

5. \(2 \div 26\)
6. \(4 \div 44\)
7. \(3 \div 72\)
8. \(2 \div 38\)
9. \(4 \div 76\)
10. \(4 \div 52\)
11. \(6 \div 84\)
12. \(9 \div 99\)
13. \(6 \div 78\)
14. \(2 \div 96\)
15. \(4 \div 56\)
16. \(5 \div 75\)
17. \(6 \div 96\)
18. \(7 \div 84\)
19. \(7 \div 91\)

Three-Digit Dividends

Divide: \(145 \div 5 = ?\)

Use the division steps to find the quotient.

**Think**

- \(5 \div 145\) 5 > 1 Not enough hundreds
- \(5 \div 145\) 5 < 14 Enough tens

**Division Steps**

- Divide.
- Multiply.
- Subtract.
- Compare.
- Bring down.
- Repeat the steps as necessary.
- Check.

Divide the tens. \(\rightarrow\) Divide the ones. \(\rightarrow\) Check.

\[\begin{array}{c|cccc}
   \hline
   2 & 9 & 4 & 29 \\
   \hline
   5 & 1 & 4 & 5 \\
   \hline
   4 & 5 & 145 \\
   \hline
   \end{array}\]

Divide and check.

20. \(3 \div 138\)
21. \(6 \div 324\)
22. \(7 \div 147\)
23. \(4 \div 296\)
24. \(5 \div 375\)
A camp counselor shares 47 marbles equally among 3 children. At most, how many marbles will each child get? How many will be left over?

To find the number of marbles, divide: \( 47 \div 3 = ? \) or \( 3)47 \)

```

1
3)47

1
3
47
3
1
7

1 is less than 3.
```

Repeat the steps to divide the ones.

```

1 5
3)47

1
3
47
3
1
7

1 5 R 2

1 5
3
47
3
1
7

The answer checks.
```

The camp counselor gives each child 15 marbles. There are 2 marbles left over.
Complete each division.

\[
\begin{array}{cccc}
1 & \text{R} & ? & 1 & \text{R} & ? & 1 & \text{R} & ? & \text{R} & \text{R} \\
4 & \overline{1 1} & 4 & 5 & 4 & 6 & 5 & 9 & 7 & 0 \\
-4 & \downarrow & -3 & \downarrow & -? & \downarrow & -? & \downarrow & -? & \downarrow \\
5 & \text{R} & 6 & 9 & 0 & 9 & 0 & 0 & 0 & 0 \\
\end{array}
\]

Divide and check.

5. \(5 \div 68\)  
6. \(2 \div 83\)  
7. \(8 \div 89\)  
8. \(4 \div 63\)  
9. \(3 \div 58\)  
10. \(3 \div 82\)  
11. \(6 \div 95\)  
12. \(5 \div 81\)  
13. \(2 \div 71\)  
14. \(7 \div 92\)  
15. \(4 \div 89\)  
16. \(3 \div 40\)  
17. \(6 \div 79\)  
18. \(7 \div 79\)  
19. \(5 \div 77\)

Find the quotient and the remainder.

20. \(73 \div 7\)  
21. \(45 \div 2\)  
22. \(85 \div 4\)  
23. \(77 \div 3\)  
24. \(98 \div 3\)  
25. \(92 \div 8\)  
26. \(74 \div 5\)  
27. \(94 \div 4\)

28. Six campers share 75 balloons equally. At most, how many does each child get? How many are left over?

29. Two groups share 45 badges equally. What is the greatest number each group gets? How many are left over?

30. Chris has 38 marbles. He puts 3 marbles in each bag. What is the greatest number of bags he can fill? How many marbles are left over?

31. Nick puts 57 books into equal stacks of 4 books each. At most, how many stacks are there? How many books are left over?

32. Round to the nearest ten. 33. Round to the nearest dollar.

32. 78  33. 85  34. 33  35. $1.46  36. $27.51  37. $31.92
Ali, Juanita, and Sara earned $11.75 doing jobs in the neighborhood. They shared the money equally. About how much money did each girl receive?

To find about how much money, estimate: $11.75 ÷ 3 = ?.

To estimate a quotient:
- Round the money amount to the nearest dollar. $11.75 → $12
- Divide mentally. $12 ÷ 3 = $4

Each girl received about $4.

Study these examples.

83 ÷ 2 = ?
83 rounds to 80.
80 ÷ 2 = 40
$8.40 ÷ 8 = ?
$8.40 rounds to $8.
$8 ÷ 8 = $1
$5.75 ÷ 3 = ?
$5.75 rounds to $6.
$6 ÷ 3 = $2

Round to the nearest ten.
1. 51  2. 29  3. 12  4. 83  5. 65
6. 39  7. 44  8. 78  9. 55  10. 56
11. 97  12. 16  13. 24  14. 62  15. 32

Round to the nearest dollar.
16. $4.60  17. $2.30  18. $1.75  19. $5.10  20. $1.55
21. $10.10  22. $20.90  23. $25.50  24. $17.99  25. $12.25
Estimate the quotient.

26. $11 \div 5$
27. $25 \div 6$
28. $39 \div 4$
29. $56 \div 3$
30. $4.60 \div 5$
31. $12.30 \div 4$
32. $1.75 \div 2$
33. $5.10 \div 5$
34. $6 \div 17.60$
35. $7 \div 48.60$
36. $8 \div 56.25$
37. $9 \div 71.79$
38. $4 \div 24.25$

39. Estimate the cost of 1 towel.
40. Estimate the cost of 1 pail.

41. Find the exact answers for exercises 39–40. Compare the exact answers with the estimated answers, and write a conclusion about them.

42. Write the compatible numbers you would use to estimate each quotient. Then estimate.

Use the pictures and estimate to solve.

Estimate: $23 \div 7$

Think

$3 \times 7 = 21$

21 is close to 23.

7 and 21 are compatible numbers.

So $23 \div 7$ is about 3.
There were 56 people in the diner. Only 6 people could be seated at the counter. How many counters would be needed to seat all the people at once? Would each counter be filled?

**Problem-Solving Strategy:** Interpret the Remainder

**Read**

Visualize yourself in the problem above as you reread it. Focus on the facts and the questions.

**Facts:**
- 56 people in the diner
- Only 6 people at the counter

**Questions:**
- How many counters would be needed?
- Would each counter be filled?

**Plan**

To find how many counters would be filled, divide: $56 \div 6 = ?$.

To find how many people would be at the last counter, find the remainder.

**Solve**

First estimate. Then divide.

- $60 \div 6 = 10$
- About 10 counters

Then divide.

- $9 \ R 2$
- $6 \overline{)5 \ 6}$
- $- 5 \ 4$
- $2$

There would be 9 full counters.
There would be only 2 people at the last counter.
To seat 56 people, 10 counters would be needed.

**Check**

Multiply the quotient by the divisor. Then add the remainder.

- $9 \times 6 + 2$
- $54 + 2$
- $56$

Does the sum equal the dividend?

Yes. Your answer is correct.
Interpret the remainder to solve each problem.

1. Pete has 45 slices of bread. He uses 2 slices to make each sandwich. What is the greatest number of sandwiches Pete can make?

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

Facts: 45 slices of bread in all
2 slices for each sandwich

Question: How many sandwiches can he make?

To find the number of sandwiches, divide: \( \frac{45}{2} = ? \).

2. Cans of juice are sold in packs of 6. The school needs 94 cans of juice. How many packs should the school buy?

3. Ramón has 23 bottles of spring water. If he puts the greatest number of bottles on each of 4 shelves, does he use all 23 bottles? Explain.

4. Elena had $19. She spent an equal amount on each of 4 sandwiches. Then she had $3 left. How much did each sandwich cost?

5. The deli packs 8 boxed lunches in each carton. How many full cartons should the scoutmaster get to feed 98 scouts at a picnic?

6. Beth received 75 orders. She gave the same number of orders to each of 9 delivery persons. At most, how many orders did each delivery person get? How many orders did Beth have to deliver herself?
Solve each problem and explain the method you used.

1. The bareback rider sews 8 sequins on each of the horses' hats. She has 62 sequins. How many hats can she sew? How many leftover sequins does she have?

2. A clown has 38 patches. He puts an equal number of patches on each of 3 jackets. At most, how many patches are on each jacket? How many extra patches does the clown have?

3. Each of the 9 clowns took the same number of balloons. There were 95 balloons. What is the greatest number of balloons each clown took? How many balloons were left over?

4. Mr. Oslow spent $34.50 for circus tickets for 5 children. About how much did each child's ticket cost?

5. The acrobat performs 97 stunts every week. She performs an equal number of stunts for each daily show during 1 week. At most, how many stunts does she perform at each show?

6. The divisor is 8. The dividend is 91. What are the quotient and remainder?

7. The product is 120. One factor is 4. What is the missing factor?
Choose a strategy from the list or use another strategy you know to solve each problem.

8. A circus parade had a bear, an elephant, a cyclist, and a ringmaster. What is their position in the parade if the elephant is not first, the ringmaster is last, and the cyclist is just before the bear?

9. Under the Big Top, 4568 people sat in section A, 3469 in section B, and 3087 in section C. How many people were sitting under the Big Top?

10. Using stilts to walk the inside of a circus ring, how far did Eddy walk in 12 steps if one step is 24 inches?

11. A clown performs in 30 acts over a 7-hour day. At most, how many acts does he perform each hour?

12. Kara jumps 6 feet high on the trampoline. Gus jumps double the 4-foot height that Yoko jumps. How much higher must each jump to reach 9 feet?

13. Kara jumped a total of 96 centimeters in 6 jumps. Each jump was the same height. How many centimeters high was each jump?

14. It takes 15 clowns to build a human tower. The base uses 2 more clowns than the third row. The second row uses 4 clowns, while the fourth uses 2 clowns, and the fifth has one clown. How many clowns are on the base and third rows?
Check Your Progress

Lessons 1–8

Find the quotient. (See pp. 364–365.)
1. \(6 \div 3\)  
2. \(60 \div 3\)  
3. \(600 \div 3\)
4. \(4 \overline{)160}\)  
5. \(9 \overline{)810}\)  
6. \(7 \overline{)700}\)

Find the quotient and the remainder. (See pp. 364–365, 368–373.)
7. \(5 \overline{)21}\)  
8. \(3 \overline{)29}\)  
9. \(6 \overline{)38}\)  
10. \(9 \overline{)74}\)
11. \(2 \overline{)25}\)  
12. \(8 \overline{)95}\)  
13. \(5 \overline{)66}\)  
14. \(6 \overline{)73}\)

Divide and check.
15. \(56 \div 7\)  
16. \(43 \div 9\)  
17. \(427 \div 7\)  
18. \(8 \overline{)328}\)

Estimate the quotient. (See pp. 374–375.)
19. \(6 \overline{)58}\)  
20. \(5 \overline{)32}\)  
21. \(4 \overline{)19}\)  
22. \(8 \overline{)37}\)
23. \(7 \overline{)$13.90}\)  
24. \(3 \overline{)$27.15}\)  
25. \(9 \overline{)$80.72}\)  
26. \(5 \overline{)$38.89}\)

Problem Solving

27. Betty Sue arranges all of her CDs in 9 rows. She has 82 CDs. How many CDs are in each row? How many CDs are left over?

28. Kyle has 96 baseball cards. He divides them equally among 9 friends. At most, how many baseball cards does each friend receive? How many are left over?

29. Jamal arranged 67 chairs into rows. There is room for only 9 chairs in each row. How many rows of chairs will there be?

30. Jill has $10 to buy a CD. The CDs are on sale at 3 for $26.75. Does Jill have enough money to buy one CD? Explain.

(See Still More Practice, p. 468.)
Three-Digit Quotients

When there are enough hundreds in a three-digit dividend, you will have a three-digit quotient.

Divide: $574 \div 2$.

Estimate: $574 \div 2 \rightarrow 600 \div 2 = 300$

Decide where to place the first digit in the quotient. Divide 5 hundreds by 2. Bring down the 7 tens. Divide 17 tens. Bring down the 4 ones. Divide 14 ones.

\[
2 \overline{)574} \\
\underline{4} \\
17 \rightarrow 1 < 2
\]

5 > 2, so divide the hundreds.

So $574 \div 2 = 287$.

Divide and check.

1. $3\overline{)885}$
2. $5\overline{)815}$
3. $6\overline{)894}$
4. $3\overline{)828}$
5. $4\overline{)752}$
6. $7\overline{)896}$
7. $2\overline{)526}$
8. $5\overline{)675}$
9. $4\overline{)984}$
10. $3\overline{)537}$
11. $5\overline{)730}$
12. $4\overline{)692}$
13. $2\overline{)918}$
14. $3\overline{)459}$
15. $7\overline{)798}$
16. $8\overline{)953}$
17. $2\overline{)837}$
18. $6\overline{)745}$
19. $5\overline{)724}$
20. $4\overline{)590}$
21. $6\overline{)877}$
22. $5\overline{)661}$
23. $7\overline{)980}$
24. $8\overline{)929}$
25. $4\overline{)987}$
Chapter 11 Test

Find the quotient and the remainder.
1. 2\(\overline{17}\)  
2. 7\(\overline{39}\)  
3. 5\(\overline{42}\)  
4. 9\(\overline{61}\)  
5. 3\(\overline{37}\)  
6. 4\(\overline{57}\)  
7. 8\(\overline{92}\)  
8. 7\(\overline{85}\)

Divide and check.
9. 72 ÷ 9  
10. 36 ÷ 7  
11. 97 ÷ 8  
12. 6\(\overline{62}\)

Estimate the quotient.
13. 3\(\overline{29}\)  
14. 4\(\overline{22}\)  
15. 8\(\overline{39}\)  
16. 5\(\overline{31}\)  
17. 4\(\overline{11.99}\)  
18. 6\(\overline{36.25}\)  
19. 9\(\overline{63.40}\)  
20. 7\(\overline{41.75}\)

Problem Solving

Use a strategy you have learned.
21. Chad received $25 for his birthday. He wants to share the money equally among his 4 nephews. At most, how much money will each nephew get? How much will be left?

22. There are 23 slices of bread in a loaf. If a mother uses 2 slices for each sandwich, how many sandwiches can she make?

Tell About It

How many digits will each quotient have? Use or draw base ten models to explain your thinking.
23. dividend: 250  
divisor: 5
24. dividend: 400  
divisor: 2
25. dividend: 120  
divisor: 4

Performance Assessment

26. Write a division problem with a divisor of 4 and a remainder of 3.
27. Write a division problem with a divisor of 6 and a remainder of 5.
Test Preparation

Choose the best answer.

1. What number comes next?
   2988, 2992, 2996, ?
   a. 2984  b. 2998  c. 3000  d. 3002

2. Mike has 8 canoes. Each canoe has 2 oars. How many oars are there altogether?
   a. 4  b. 10  c. 16  d. 18

3. $9 \div 36$
   a. 3  b. 4  c. 6  d. 4 R2

4. Which figure is a rectangle?
   - a. Figure A  b. Figure B  c. Figure C  d. none of these

5. $\frac{124}{6}$
   a. 624  b. 644  c. 744  d. 724

   $18 \div 4$
   a. 70  b. 80  c. 90  d. 100

7. $600 \div 3$
   a. 20  b. 100  c. 300  d. not given

8. Find the missing factor.
   $1 \times 7 = 7 \times ?$
   a. 0  b. 1  c. 7  d. 8

9. Which is greater:
   300 mL or 30 L?
   a. 300 mL  b. 30 L  c. same amount  d. cannot tell

10. $72 \div 8 = ?$
    a. 7  b. 8  c. 9  d. 80

11. Which describes the figure?
    - a. rectangular prism, 8 edges  b. pyramid, 5 edges  c. cube, 12 edges  d. pyramid, 8 edges

12. $3 \div 38$
    a. 11 R2  b. 12 R2  c. 15 R2  d. 12 R1

    $8 \times \$0.36$
    a. $1.60$  b. $3.20$  c. $8.00$  d. $32.00$

    $9 \div 26.50$
    a. $3.00$  b. $5.00$  c. $6.00$  d. $7.00$
15. Which is most likely to be the distance around a lake?
   a. 10 m  b. 10 cm  c. 10 dm  d. 10 km

16. \( 7 \div 37 \)
   a. 4 R9  b. 5  c. 5 R2  d. 6

17. What time is shown on the clock?
   a. 2:09  b. 9:15  c. 3:45  d. 2:45

18. Ben draws a rectangle 11 cm long and 5 cm wide. What is the perimeter of the rectangle?
   a. 16 cm  b. 22 cm  c. 32 cm  d. 44 cm

19. \( 6 \div 288 \)
   a. 41  b. 47 R6  c. 48  d. 48 R2

20. \( 462 - 291 \)
   a. 171  b. 270  c. 753  d. not given

21. Which events are equally likely?
   a. red and green  b. yellow and blue  c. blue and red  d. green and yellow

22. Mike ran each day from Monday through Friday. He ran 35 miles altogether. About how many miles did he run each day?
   a. 5 miles  b. 7 miles  c. 35 miles  d. not given

23. Peter has to put 58 robots on the shelves at his store. Each shelf can hold 8 robots. How many shelves will he need? Will each shelf be full?

24. If you used the spinner in exercise 21 above, what is the probability of the spinner landing on red?
In this chapter you will:
Explore equivalent fractions
Compare, order, add, and subtract fractions with models
Explore mixed numbers
Solve problems by using a drawing or model

Critical Thinking/ Finding Together
Relate the fraction strip for thirds at the bottom of the page to the children.

Sylvia Cassedy
A **fraction** can name one or more equal parts of a whole or of a set.

Each fraction strip in the table is divided into equal parts.

**Fraction Table**

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Numer.</th>
<th>Denom.</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>2</td>
<td>2</td>
<td>half</td>
</tr>
<tr>
<td>1/3</td>
<td>3</td>
<td>3</td>
<td>third</td>
</tr>
<tr>
<td>1/4</td>
<td>4</td>
<td>4</td>
<td>fourth</td>
</tr>
<tr>
<td>1/5</td>
<td>5</td>
<td>5</td>
<td>fifth</td>
</tr>
<tr>
<td>1/6</td>
<td>6</td>
<td>6</td>
<td>sixth</td>
</tr>
<tr>
<td>1/7</td>
<td>7</td>
<td>7</td>
<td>seventh</td>
</tr>
<tr>
<td>1/8</td>
<td>8</td>
<td>8</td>
<td>eighth</td>
</tr>
<tr>
<td>1/9</td>
<td>9</td>
<td>9</td>
<td>ninth</td>
</tr>
<tr>
<td>1/10</td>
<td>10</td>
<td>10</td>
<td>tenth</td>
</tr>
<tr>
<td>1/11</td>
<td>11</td>
<td>11</td>
<td>eleventh</td>
</tr>
<tr>
<td>1/12</td>
<td>12</td>
<td>12</td>
<td>twelfth</td>
</tr>
</tbody>
</table>

**Word name:** five eighths  

Write: \( \frac{5}{8} \)

\( \frac{5}{8} \) of this figure is purple.  

\( \frac{5}{8} \) of the set is red.
Write each as a fraction.
1. three fourths  
2. one half  
3. five sixths  
4. one eighth  
5. two ninths  
6. three thirds

Write the word name for each fraction.
7. \(\frac{1}{4}\)  
8. \(\frac{2}{7}\)  
9. \(\frac{4}{5}\)  
10. \(\frac{7}{9}\)  
11. \(\frac{1}{12}\)  
12. \(\frac{3}{10}\)  
13. \(\frac{5}{8}\)  
14. \(\frac{1}{6}\)  
15. \(\frac{2}{3}\)  
16. \(\frac{5}{11}\)

Problem Solving

17. There are 12 months in a year. What part of the year is July?

18. What part of a year begins with the letter J?

19. Does the figure at the right show fourths? Why or why not?

20. Do the fractional parts get larger or smaller when you divide a whole into more and more equal parts? Use a model or draw a picture to explain your answer.

21. Joseph cut an apple pie into 10 equal pieces and a cherry pie into 8 equal pieces. If both pies are the same size, which pie is cut into larger pieces?

Draw a picture to show each fraction.
22. \(\frac{1}{4}\)  
23. \(\frac{1}{2}\)  
24. \(\frac{5}{6}\)  
25. \(\frac{3}{8}\)  
26. \(\frac{2}{5}\)

TEST PREPARATION

27. There are 7 days in a week. What part of a week is Monday?
A. \(\frac{1}{12}\)  
B. \(\frac{1}{7}\)  
C. \(\frac{7}{12}\)  
D. \(\frac{6}{7}\)
Equivalent Fractions

Different fractions can name the same amount of the same whole. Fractions that name the same amount are called equivalent fractions.

The strips are the same length.

1 of 3 equal parts equals \( \frac{1}{3} \).

2 of 6 equal parts equals \( \frac{2}{6} \).

3 of 9 equal parts equals \( \frac{3}{9} \).

\( \frac{1}{3} = \frac{2}{6} = \frac{3}{9} \)

\( \frac{1}{3} \), \( \frac{2}{6} \), and \( \frac{3}{9} \) are equivalent fractions.

Use fraction strips to model and write equivalent fractions.

1. \( \frac{2}{5} = \frac{?}{10} \)

2. \( \frac{3}{4} = \frac{?}{8} \)

3. \( \frac{2}{6} = \frac{?}{12} \)

4. \( \frac{3}{5} = \frac{?}{10} \)

5. \( \frac{6}{9} = \frac{?}{12} \)

6. \( \frac{4}{8} = \frac{?}{12} \)

7. Use fraction strips for fourths, sixths, eighths, tenths, and twelfths to find equivalent fractions for \( \frac{1}{2} \). Write the equivalent fractions.

8. Describe the pattern in the fractions you wrote for exercise 7.
Find the quotient and the remainder.

12. $76 ÷ 8$  
13. $97 ÷ 4$  
14. $53 ÷ 2$  
15. $47 ÷ 3$
You can estimate using fractions to tell about how much.

About how full is each cup?

Write about $\frac{1}{4}$, about $\frac{1}{2}$, or about $\frac{3}{4}$ to estimate parts of a whole.

Is the estimate correct? Write Yes or No.

1. About what part is light blue?
   Estimate: about $\frac{3}{4}$

2. About how much pizza is left?
   Estimate: about $\frac{1}{2}$

3. About what part of the hour has passed?
   Estimate: about $\frac{1}{2}$

4. About how much of the pie is left?
   Estimate: about $\frac{1}{4}$

5. About how much sand is in the bucket?
   Estimate: about $\frac{3}{4}$

6. About what part of the sandwich is left?
   Estimate: about $\frac{1}{4}$
Estimate the fraction for the part of each set that is shaded. Write less than $\frac{1}{2}$ or more than $\frac{1}{2}$.

7. ★★★
   ★★★
   ★★★
   ★★★
   less than $\frac{1}{2}$

8. [Square symbols represent shaded parts]

9. △△△△

10. [Pentagon symbols represent shaded parts]

11. [Circle symbols represent shaded parts]

12. [Star symbols represent shaded parts]

Estimate the time.

13. [Clock showing time]
   about $\frac{1}{4}$ to two

14. [Clock showing time]

15. [Clock showing time]

16. [Clock showing time]

Use fractions to estimate length.

17. Have a classmate cut a piece of string equal to the length of your arm. First estimate, then measure the length of the piece of string. Choose objects about the same length, about $\frac{1}{4}$ of the length, about $\frac{1}{2}$ of the length, and about $\frac{3}{4}$ of the length of the piece of string. Then find the actual measure of each object to see if the estimate is reasonable.
Materials: 1 fraction strip that shows thirds, 1 fraction strip that shows fourths, crayons

Compare \( \frac{1}{3} \) and \( \frac{3}{4} \).

**Step 1** Shade 1 equal part of a fraction strip that shows thirds.

\[
\begin{array}{c}
\frac{1}{3} \\
\frac{1}{3}
\end{array}
\]

What fraction does your model represent?

**Step 2** Shade 3 equal parts of the fraction strip that shows fourths.

\[
\begin{array}{c}
\frac{1}{4} \\
\frac{1}{4} \\
\frac{1}{4} \\
\frac{1}{4}
\end{array}
\]

What fraction does this model represent?

**Step 3** Place your fraction models one below the other.

\[
\begin{array}{c}
\frac{1}{3} \\
\frac{1}{3}
\end{array}
\]

\[
\begin{array}{c}
\frac{1}{4} \\
\frac{1}{4}
\end{array}
\]

Sue colored \( \frac{1}{3} \) of the stars on her banner. Ben colored \( \frac{3}{4} \) of the stars on his banner. Who colored the greater part?

To find who colored the greater part, compare the fractions. Use fraction strips.
Step 4

Compare your fraction models.

Which fraction is greater? Explain your answer.

Use the symbols < or > to write a sentence that tells which fraction is greater.

Who colored the greater part of his or her banner?

You can also use a number line to compare fractions.

Compare \( \frac{5}{6} \) and \( \frac{3}{6} \).

Step 1

Find the two fractions on a number line divided into six equal parts.

\[ \begin{array}{cccccccc}
\text{0} & \frac{1}{6} & \frac{2}{6} & \frac{3}{6} & \frac{4}{6} & \frac{5}{6} & \frac{6}{6} \\
\text{0} & \frac{1}{6} & \frac{2}{6} & \frac{3}{6} & \frac{4}{6} & \frac{5}{6} & \frac{6}{6} \\
\end{array} \]

Step 2

Compare the fractions.

Which fraction is less? Explain your answer.

Use the symbols < or > to write a sentence that tells which fraction is less.

Compare. Write < or >. Use fraction strips or a number line.

1. \( \frac{1}{4} \) ? \( \frac{3}{4} \)
2. \( \frac{1}{3} \) ? \( \frac{1}{6} \)
3. \( \frac{1}{2} \) ? \( \frac{5}{8} \)
4. \( \frac{1}{4} \) ? \( \frac{3}{8} \)
5. \( \frac{1}{2} \) ? \( \frac{3}{4} \)
6. \( \frac{3}{8} \) ? \( \frac{7}{8} \)

7. Explain in your Math Journal how you can compare fractions with the same denominators and with unlike denominators.
Order Fractions

Peggy cut three lengths of ribbon. They were $\frac{2}{3}$ yard, $\frac{3}{6}$ yard, and $\frac{5}{6}$ yard long. Which was the longest length? Which was the shortest?

To find the longest and shortest lengths, first compare the fractions and then order them from greatest to least.

Materials: 1 fraction strip that shows thirds, two fraction strips that show sixths, crayons

Order $\frac{2}{3}$, $\frac{3}{6}$, and $\frac{5}{6}$.

Step 1
Shade 2 equal parts of a fraction strip that shows thirds.

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{2}{3}$

Step 2
Shade 3 equal parts and 5 equal parts of two fraction strips that show sixths.

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

Step 3
Place your fraction models one below the other.

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{2}{3}$

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

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Compare your fraction models.

Which fraction is the greatest? Explain your answer.

Which fraction is the least? Explain your answer.

Write the fractions in order from greatest to least.

Which was the longest length of ribbon? Which was the shortest?

Write in order from least to greatest.
Use fraction strips to help.

1. \[\frac{7}{10} \quad \frac{4}{10} \quad \frac{8}{10}\]

2. \[\frac{5}{8} \quad \frac{1}{4} \quad \frac{7}{8}\]

3. \[\frac{1}{2} \quad \frac{1}{8} \quad \frac{1}{4}\]

4. \[\frac{9}{10} \quad \frac{1}{2} \quad \frac{1}{5}\]

5. \[\frac{1}{2} \quad \frac{3}{8} \quad \frac{1}{4}\]

6. \[\frac{3}{4} \quad \frac{1}{2} \quad \frac{1}{8}\]

Write in order from greatest to least.
Use fraction strips to help.

7. \[\frac{3}{5} \quad \frac{4}{5} \quad \frac{1}{5}\]

8. \[\frac{6}{8} \quad \frac{1}{4} \quad \frac{3}{8}\]

9. \[\frac{1}{2} \quad \frac{4}{10} \quad \frac{7}{10}\]

10. \[\frac{7}{8} \quad \frac{1}{2} \quad \frac{3}{4}\]

11. \[\frac{2}{8} \quad \frac{3}{4} \quad \frac{1}{2}\]

12. \[\frac{5}{8} \quad \frac{2}{4} \quad \frac{9}{10}\]

13. Explain in your Math Journal how you can order fractions with the same denominators and with unlike denominators.
Fractions help us find parts of a set.

Donna has 12 eggs in a carton. One half of them are brown. How many eggs are brown?

\[ \frac{1}{2} \text{ of } 12 = ? \]

To find \( \frac{1}{2} \text{ of } 12 \), divide by 2.

\[ \frac{1}{2} \text{ of } 12 = \frac{6}{12} = \frac{1}{2} \times 6 = 3 \]

Six eggs are brown.

Study these examples.

\[ \frac{1}{5} \text{ of } 15 = \frac{3}{15} \]

\[ \frac{1}{4} \text{ of } 20 = \frac{5}{20} \]

Find part of the set.

1. \( \frac{1}{2} \text{ of } 10 = ? \)

2. \( \frac{1}{4} \text{ of } 16 = ? \)

3. \( \frac{1}{3} \text{ of } 6 = ? \)

4. \( \frac{1}{3} \text{ of } 9 = ? \)

5. \( \frac{1}{7} \text{ of } 7 = ? \)

6. \( \frac{1}{2} \text{ of } 20 = ? \)
Find part of the number.

7. \( \frac{1}{2} \) of 6 = ?
   \[ 6 \div 2 = ? \]

8. \( \frac{1}{4} \) of 8 = ?
   \[ 8 \div 4 = ? \]

9. \( \frac{1}{2} \) of 4 = ?
   \[ 4 \div 2 = ? \]

10. \( \frac{1}{3} \) of 12 = ?
    \[ 12 \div 3 = ? \]

11. \( \frac{1}{4} \) of 16 = ?
    \[ 16 \div 4 = ? \]

12. \( \frac{1}{5} \) of 10 = ?
    \[ 10 \div 5 = ? \]

13. \( \frac{1}{4} \) of 12

14. \( \frac{1}{2} \) of 8

15. \( \frac{1}{3} \) of 15

16. \( \frac{1}{5} \) of 20

17. \( \frac{1}{4} \) of 32

18. \( \frac{1}{3} \) of 27

19. \( \frac{1}{4} \) of 40

20. \( \frac{1}{5} \) of 25

21. \( \frac{1}{10} \) of 40

22. \( \frac{1}{7} \) of 21

23. \( \frac{1}{5} \) of 45

24. \( \frac{1}{6} \) of 18

**Problem Solving**

25. Which is longer, \( \frac{1}{4} \) of a foot or 4 inches?

26. Which is longer, \( \frac{1}{3} \) of a yard or 5 feet?

27. Which is longer, \( \frac{2}{3} \) of a foot or 10 inches?

**Critical Thinking**

Draw and cut out 10 circles.
Divide the circles into 5 groups of 2.
Use your circles to help you complete each.

28. If \( \frac{1}{5} \) of 10 is 2, then \( \frac{2}{5} \) of 10 is 4.

29. \( \frac{3}{5} \) of 10 is ?

30. \( \frac{4}{5} \) of 10 is ?

31. \( \frac{5}{5} \) of 10 is ?

32. Explain the pattern you see in exercises 28–31.
12-7 Mixed Numbers

A **mixed number** is a number made up of a whole number and a fraction.

- Write the mixed number for the model shown as: \(1 \frac{1}{2}\).
  
  Read \(1 \frac{1}{2}\) as: one and one half.

- You can use a number line to help you write a mixed number. Write the mixed number for the point on the number line as: \(1 \frac{3}{4}\).
  
  Read \(1 \frac{3}{4}\) as: one and three fourths.

Write the mixed number for each.

1. \(\text{[Diagram of mixed numbers]}\)

2. \(\text{[Diagram of mixed numbers]}\)

3. \(\text{[Number line]}\)

4. \(\text{[Number line]}\)
Write the mixed number and the word name for each.

5. \[ \frac{4}{5}; \text{one and four fifths} \]

6. \[ \frac{6}{6}; \text{two} \]

7. \[ \text{Apple pictograph} \]

8. \[ \text{Cup pictograph} \]

9. \[ \text{Apple pictograph} \]

10. \[ \text{Sandwich pictograph} \]

Estimate about how many. Write the mixed number for each.

11. \[ \text{Baguette pictograph} \]

12. \[ \text{Cups pictograph} \]

13. \[ \text{Apples pictograph} \]

14. \[ \text{Sandwiches pictograph} \]

Problem Solving

Solve. Use the pictograph.

15. How many apples did each person eat?

16. Who ate the most?

17. Who ate the least?

<table>
<thead>
<tr>
<th></th>
<th>Apples Eaten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marsha</td>
<td>🍎🍎🍎🍎</td>
</tr>
<tr>
<td>Janice</td>
<td>🍎🍎🍎</td>
</tr>
<tr>
<td>Jake</td>
<td>🍎🍎🍎🍎🍎</td>
</tr>
</tbody>
</table>

🍎 = 1 apple. 🍎 = \( \frac{1}{2} \) apple.
Ann, Tom, and Jody painted a fence. Ann painted $\frac{1}{8}$ of the fence and Tom painted $\frac{3}{8}$ of it. What fractional part of the fence did Ann and Tom paint together?

Materials: 1 fraction strip that shows eighths, crayons

**Step 1**
Shade $\frac{1}{8}$ for the part of the fence that Ann painted.

```
0 1 2 3 4 5 6 7 8
```

```
1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8
```

```
\frac{1}{8}
```

**Step 2**
Now shade $\frac{3}{8}$ more for the part of the fence that Tom painted.

```
0 1 2 3 4 5 6 7 8
```

```
1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8
```

```
1/8 3/8
```

How many eighths are shaded in all?

Now write an addition sentence that tells the fractional part of the fence that Ann and Tom painted together.

$$\frac{1}{8} + \frac{3}{8} = \frac{4}{8}$$

Add the numerators.

The denominator stays the same.

You can also use a number line to add fractions.
Step 3
Locate the sum on the fraction table at the right.
Name all the equivalent fractions for the sum.
Which equivalent fraction uses the least number of parts of the whole?

\[
\frac{4}{8} = \frac{1}{2} \quad \frac{1}{2} \text{ is in simplest form.}
\]
It has the least number of parts.

Use fraction strips or a number line to model each exercise. Then find the sum in simplest form.

1. \(\frac{1}{3} + \frac{1}{3}\)
2. \(\frac{3}{5} + \frac{1}{5}\)
3. \(\frac{2}{4} + \frac{1}{4}\)
4. \(\frac{3}{6} + \frac{2}{6}\)
5. \(\frac{3}{7} + \frac{3}{7}\)
6. \(\frac{3}{8} + \frac{2}{8}\)
7. \(\frac{6}{9} + \frac{2}{9}\)
8. \(\frac{3}{10} + \frac{5}{10}\)
9. \(\frac{7}{12} + \frac{2}{12}\)

Write an addition sentence to represent each model.

10. [Diagram of fraction strips]
11. [Diagram of fraction strips]
12. [Number line model]
13. [Number line model]

14. Write a rule in your Math Journal to tell how to add fractions with the same denominator.
Subtract Fractions

Matthew ran \( \frac{3}{10} \) of a mile. Charlie ran \( \frac{1}{10} \) of a mile. How much farther did Matthew run than Charlie?

Materials: 1 fraction strip that shows tenths, 6 fraction strips that show sixths, crayons, fraction table

Step 1
Shade 3 equal parts of a fraction strip that shows tenths.

\[ \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \]

What fraction does your model represent?

Step 2
Now draw an X through 1 shaded part of your fraction strip.

\[ \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \]

How many shaded tenths are left?

Write a subtraction sentence to show how much farther Matthew ran than Charlie.

\[ \frac{3}{10} - \frac{1}{10} = \frac{2}{10} \]

Subtract the numerators.

The denominator stays the same.

You can also use a number line to subtract fractions.

Write this amount as a fraction in simplest form.

Use a fraction table to help.
Step 3

Use your fraction strips for sixths to find each difference.

\[
\begin{align*}
\frac{6}{6} - \frac{1}{6} &= ? \\
\frac{5}{6} - \frac{1}{6} &= ? \\
\frac{4}{6} - \frac{1}{6} &= ? \\
\frac{3}{6} - \frac{1}{6} &= ? \\
\frac{2}{6} - \frac{1}{6} &= ? \\
\frac{1}{6} - \frac{1}{6} &= ?
\end{align*}
\]

What pattern do you notice?

Use fraction strips or a number line to model each exercise. Then find the difference in simplest form. Use a fraction table to help.

1. \( \frac{7}{10} - \frac{2}{10} = ? \)
2. \( \frac{6}{9} - \frac{2}{9} = ? \)
3. \( \frac{4}{6} - \frac{3}{6} = ? \)
4. \( \frac{7}{12} - \frac{4}{12} = ? \)
5. \( \frac{6}{8} - \frac{4}{8} = ? \)
6. \( \frac{3}{3} - \frac{1}{3} = ? \)

Write a subtraction sentence to represent each model. Write the difference in simplest form.

7. [Fraction strips model: \( \frac{1}{9} - \frac{1}{9} \)]

8. [Number line model: \( \frac{0}{4} \) to \( \frac{4}{4} \)]

9. [Fraction strips model: \( \frac{1}{12} - \frac{1}{12} \)]

10. [Number line model: \( \frac{0}{5} \) to \( \frac{5}{5} \)]

11. Write a rule about how to subtract fractions with the same denominators.

12. Use fraction strips or a number line to model and explain why \( \frac{3}{8} - \frac{1}{8} \) does not equal \( \frac{2}{0} \).
A 5-oz jar of mustard costs 75¢. What is the unit cost, or cost per ounce, of the jar of mustard?

Think:
5 oz cost 75¢. So 1 oz costs \( \frac{1}{5} \) of 75¢.

\[ \frac{1}{5} \text{ of 75¢} = ? \]

Remember: \( \frac{1}{5} \) means 1 out of 5 equal parts.

To find \( \frac{1}{5} \) of 75¢, divide by 5.

\[ 75¢ \div 5 = ? \]

Estimate: ? tens \( \times 5 = 7 \) tens
1 ten \( \times 5 = 5 \) tens

Try 1.

Divide the tens.

\[
\begin{array}{c}
\frac{1}{5)7 \quad 5¢ \\
\downarrow \\
-5 \\
\downarrow \\
25 \\
\end{array}
\]

Divide the ones.

\[
\begin{array}{c}
\frac{1}{5)7 \quad 5¢ \\
\downarrow \\
-5 \\
\downarrow \\
25 \\
\end{array}
\]

Check.

Write ¢ in the quotient.

\[
\begin{array}{c}
2 \\
\times 5 \\
\hline
15¢ \\
\hline
75¢
\end{array}
\]

The unit cost of the jar of mustard is 15¢.

Find the unit cost.
1. 90¢
2. 63¢
Find the part of each amount.

3. \(\frac{1}{3}\) of 27¢
4. \(\frac{1}{4}\) of 36¢
5. \(\frac{1}{2}\) of $16
6. \(\frac{1}{5}\) of $25
7. \(\frac{1}{6}\) of $78
8. \(\frac{1}{9}\) of $45
9. \(\frac{1}{8}\) of 96¢
10. \(\frac{1}{7}\) of 77¢
11. \(\frac{1}{2}\) of 68¢
12. \(\frac{1}{6}\) of 72¢
13. \(\frac{1}{3}\) of $45
14. \(\frac{1}{5}\) of $90

**Problem Solving**

15. A package of 6 pencils costs 96¢. What is the unit cost per pencil?

16. A 4-oz jar of spice costs 92¢. What is the unit cost per ounce?

17. An 8-oz jar of jelly is on sale for 80¢. Another brand of jelly comes in a 6-oz jar. It is on sale for 66¢. Which jar of jelly is the better buy? Why?

18. A 5-oz can of fruit is on sale for 65¢. Another brand of fruit comes in an 8-oz can. It is on sale for 72¢. Which can of fruit is the better buy? Why?

**CHALLENGE**

Mia spends $20 on food, toys, and books at the fair. Jamie spends $16 on food, toys, and books.

Use the information above and the circle graphs to solve each problem.

19. How much money does Mia spend on food? toys? books?

20. How much money does Jamie spend on food? toys? books?

21. Mia and Jamie each spend \(\frac{1}{4}\) of their money on food. Do they spend the same amount? Explain your answer.
Kai cuts a large watermelon into 8 equal pieces. Each child eats one piece. They eat $\frac{3}{4}$ of the watermelon. How many children are there?

**Read**

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

**Facts:**
- 8 pieces of watermelon
- $\frac{3}{4}$ are eaten
- Each child eats one piece.

**Question:** How many children are there?

**Plan**

Look at the drawing.
It shows $\frac{3}{4}$ of 8 pieces.
To find the number of children, find $\frac{1}{4}$ of 8.

**Solve**

$\frac{1}{4}$ of 8 = $\frac{2}{4}$

8 ÷ 4 = 2

Since $\frac{1}{4}$ of 8 = 2 pieces, then

$\frac{2}{4}$ of 8 = 4 pieces,

and $\frac{3}{4}$ of 8 = 6 pieces.

Since each child eats 1 piece and 6 pieces are eaten, there are 6 children.

**Check**

Use the drawing and count to find that

$\frac{3}{4}$ of 8 = 6.

Your answer checks.
Use a drawing or a model to solve each problem.

1. Kai finished \( \frac{2}{3} \) of his school project.
   Libby finished \( \frac{4}{6} \) of her project.
   Who has more of her or his project finished?

   **Facts:**
   - Kai has \( \frac{2}{3} \) finished.
   - Libby has \( \frac{4}{6} \) finished.

   **Question:** Who has more finished?

   **Plan**
   Use a model or fraction strips to compare.
   Shade \( \frac{2}{3} \) of Kai's project.
   Shade \( \frac{4}{6} \) of Libby's project.

2. Thirty-three children tried out for the soccer team. One third of the children were selected. How many children were selected?

3. One half of the bran muffins were gone when Judy came home. If there were 16 muffins to begin with, how many were left?

4. Mike bought 16 cans of juice. He used \( \frac{1}{8} \) of them at breakfast and \( \frac{2}{8} \) of them for a party.
   Did Mike use more or less than \( \frac{1}{2} \) of the cans?

5. What part of a farmer’s field can hold corn if \( \frac{1}{2} \) is planted with wheat, \( \frac{1}{8} \) with oats, and \( \frac{2}{8} \) with alfalfa?

6. A farmer’s property is \( \frac{1}{3} \) soil, \( \frac{1}{4} \) water, and \( \frac{1}{6} \) timber. Copy and shade the model to show these land forms.

7. Use the model for problem 6 to write and solve a problem.
Solve each problem and explain the method you used.

1. Mr. Fertal cut a loaf of bread into 8 equal parts. He gave 3 parts to a friend. Write a fraction for the part of the loaf Mr. Fertal kept.

2. Sue baked 2 cakes the same size. She cut one cake into tenths and the other into twelfths. Which cake had:
   a. more pieces?
   b. larger pieces?

3. The Gomez family bought \( \frac{2}{3} \) pound of cookies. The Shaw family bought \( \frac{5}{9} \) pound of cookies. Which family bought more?

4. Ten fruit pies were sold. Five of them were apple. What fractional part was apple?

5. A pound cake is \( 4 \frac{7}{8} \) in. high. An angel food cake is \( 5 \frac{1}{4} \) in. high. Which cake is closest to 5 in. high?

6. Ms. DiFurio cut a pie into 8 pieces. She served 5 pieces. Does she have more or less than \( \frac{1}{2} \) of the pie left?

7. The baker sold 12 fruit tarts. One third of them were raspberry. The rest were blueberry. How many blueberry tarts did the baker sell?

8. Jo baked 1 tray of rolls. Drew baked 2 trays of rolls. Ed baked \( \frac{2}{3} \) tray of rolls. How many trays of rolls did they bake in all?
Choose a strategy from the list or use another strategy you know to solve each problem.

9. Tyrone baked a pie for \( \frac{3}{4} \) of an hour. His sister baked a turnover for \( \frac{1}{4} \) of an hour. How much longer did the pie take to bake?

10. Yvonne, Curt, and Joel each baked bread. Joel's bread rose less than Yvonne's. Joel's bread rose more than Curt's. If the tallest loaf rose \( 7 \frac{1}{4} \) in., whose loaf was the tallest?

11. Amy used 2 cups of cream to make a chocolate pie and \( \frac{2}{3} \) cup of cream to make the topping. How much cream did she use altogether?

12. Ron gave one half of his 12 cookies away. He ate one half of what was left. How many cookies did Ron eat?

13. The baker made 6 cakes. He iced one third of them. How many cakes were iced? How many cakes were not iced?

14. Ms. Murphy cut a cake into twelve equal pieces. Each guest ate one piece. Altogether they ate \( \frac{1}{3} \) of the cake. How many guests were there? What part of the cake was not eaten?

The graph shows the results of a survey of 8 students. Use the graph for problems 15–16.

15. Which kind of bread did the most students like? the fewest students like?

16. How many more students liked white bread than rye bread?
Check Your Progress

Lessons 1–12

Write the fraction for the shaded part of each figure. 
(See pp. 386–387.)

1.  

2.  

3.  

4.  

Write the equivalent fraction for each. 
(See pp. 388–389.)

5. \( \frac{1}{6} = \frac{2}{12} \)

6. \( \frac{3}{5} = \frac{7}{10} \)

7. \( \frac{1}{3} = \frac{7}{9} \)

8. \( \frac{3}{12} = \frac{7}{4} \)

Find part of the number or amount. 
(See pp. 396–397, 404–405.)

9. \( \frac{1}{3} \) of 9

10. \( \frac{1}{5} \) of 25

11. \( \frac{1}{7} \) of $42

12. \( \frac{1}{10} \) of $90

Write the mixed number and the word name. 
(See pp. 394–395, 398–399.)

13. 

14. 

Order from least to greatest.

15. \( \frac{7}{10}, \frac{5}{10}, \frac{3}{10} \)

Order from greatest to least.

16. \( \frac{3}{6}, \frac{1}{3}, \frac{5}{6} \)

Problem Solving

17. A spinner has 6 equal parts. There are 2 red parts, 3 blue parts, and 1 green part. What part of the spinner is blue?

18. Nova strings \( \frac{3}{8} \) of the beads and Des strings \( \frac{5}{8} \) of the beads. Who strings more beads?

Use this circle graph to answer each problem.

19. What fractional part of Earl’s homework time is spent on Science and English?

20. What fractional part tells how much more time Earl spends on Math than History?

Earl’s Homework Time

(See Still More Practice, p. 469.)
Find the Original Number

Jaime received 10 prize baseball cards from José’s collection. If this was \(\frac{1}{5}\) of José’s collection, how many cards did José have in his original collection?

Draw a picture of José’s original collection.

**Think**

Fifths means that you can separate the collection into 5 equal groups. There are 10 cards in each group.

To find how many cards,

add: \(10 + 10 + 10 + 10 + 10 = 50\)

or

multiply: \(5 \times 10 = 50\)

José had 50 baseball cards in his original collection.

Find the original number.

1. \(\frac{1}{2}\) of \(\_\) = 5
2. \(\frac{1}{5}\) of \(\_\) = 7
3. \(\frac{1}{4}\) of \(\_\) = 8
4. \(\frac{1}{3}\) of \(\_\) = 6
5. \(\frac{1}{8}\) of \(\_\) = 3
6. \(\frac{1}{2}\) of \(\_\) = 10
7. \(\frac{1}{7}\) of \(\_\) = 4
8. \(\frac{1}{6}\) of \(\_\) = 5
9. \(\frac{1}{3}\) of \(\_\) = 9
10. \(\frac{1}{4}\) of \(\_\) = 3
11. \(\frac{1}{2}\) of \(\_\) = 7
12. \(\frac{1}{5}\) of \(\_\) = 4
Chapter 12 Test

Write the equivalent fraction for each.

1. \( \frac{1}{5} = \frac{?}{10} \)
2. \( \frac{5}{6} = \frac{?}{12} \)
3. \( \frac{2}{3} = \frac{?}{9} \)
4. \( \frac{6}{12} = \frac{?}{2} \)

Find part of the number or the amount.

5. \( \frac{1}{4} \) of 12
6. \( \frac{1}{2} \) of 18
7. \( \frac{1}{6} \) of $24
8. \( \frac{1}{10} \) of $50

Write the mixed number and the word name for each.

9. 

10. 

Add or subtract.

11. \( \frac{5}{10} + \frac{3}{10} \)
12. \( \frac{4}{6} - \frac{1}{6} \)
13. \( \frac{2}{5} + \frac{2}{5} \)
14. \( \frac{5}{7} - \frac{3}{7} \)

Problem Solving

Use a strategy you have learned.

15. A package of 6 erasers costs 78¢. What is the unit cost per eraser?

16. Ben walks \( \frac{5}{10} \) of a mile.
   Sam walks \( \frac{3}{10} \) of a mile.
   Who walks the greater distance?

Tell About It

Tell whether more or less than \( \frac{1}{2} \) of each figure or set is not colored. Explain.

17. 

18. 

Performance Assessment

19. Write in the numerators to make fractions that are in order from least to greatest.
   \( \frac{?}{8}, \frac{?}{8}, \frac{?}{10} \)

20. Write in the numerators to make fractions that are in order from greatest to least.
   \( \frac{?}{8}, \frac{?}{6}, \frac{?}{6} \)
Test Preparation

Choose the best answer.

1. Which is most likely to be about the length of a CD case?
   a. 10 m        b. 1 cm        c. 10 cm        d. 1 m

2. Which statement is true?
   a. \( \frac{5}{8} > \frac{6}{8} \)        b. \( \frac{1}{8} < \frac{8}{8} \)        c. \( \frac{3}{8} < \frac{3}{8} \)        d. \( \frac{4}{8} > \frac{2}{8} \)

3. \( 2041 \times 4 \)
   a. 2045        b. 8064        c. 8164        d. 8464

4. \( 42 \div 7 \)
   a. 6          b. 7          c. 35          d. 49

5. How many more students have a dog than have a snake?
   a. 5          b. 9          c. 10          d. 19

6. \( 6 \overline{5}6 \)
   a. 8          b. 8 R8        c. 9          d. 9 R2

7. Which fractions are equivalent?
   a. \( \frac{2}{3}, \frac{4}{4} \)        b. \( \frac{3}{4}, \frac{4}{6} \)        c. \( \frac{3}{4}, \frac{4}{6} \)        d. \( \frac{2}{3}, \frac{4}{6} \)

8. \( 500 - 48 \)
   a. 548        b. 462        c. 452        d. 10

9. Which is the correct fraction for five sixths?
   a. \( 5\frac{1}{6} \)        b. \( \frac{5}{5} \)        c. \( \frac{6}{6} \)        d. \( \frac{5}{6} \)

10. Which figure below is similar to the one above?
    a. \( \)        b. \( \)        c. \( \)        d. \( \)
11. How much time is between 11:30 A.M. and 3:15 P.M.?
   a. 3 h 45 min  
   b. 4 h 15 min  
   c. 4 h 45 min  
   d. 8 h 15 min

12. 263 + 3781
   a. 3944  
   b. 4044  
   c. 6311  
   d. not given

13. Find part of the set.
   a. 3  
   b. 4  
   c. 8  
   d. 12

14. $3032 \times \frac{3}{4}$
   a. 996  
   b. 9196  
   c. 9396  
   d. not given

15. Steve sold 278 CDs on Monday. He ended the day with 1645 CDs. How many CDs did he start with?
   a. 1367  
   b. 1813  
   c. 1923  
   d. not given

16. Estimate the quotient.
   $\frac{8}{7.95}$
   a. $\frac{1}{3}$  
   b. $\frac{1}{3}$  
   c. $\frac{1}{3}$  
   d. not given

17. Which is most likely to be the mass of a gorilla?
   a. 220 km  
   b. 2 g  
   c. 220 g  
   d. 220 kg

18. Which shows the fractions from greatest to least?
   a. $\frac{3}{6}$, $\frac{2}{3}$, $\frac{3}{4}$  
   b. $\frac{3}{4}$, $\frac{2}{3}$, $\frac{3}{6}$  
   c. $\frac{3}{6}$, $\frac{3}{4}$, $\frac{2}{3}$  
   d. $\frac{3}{4}$, $\frac{3}{6}$, $\frac{2}{3}$

19. $1047 \times 8$
   a. 8026  
   b. 8136  
   c. 8376  
   d. not given

20. Cans of juice are sold in packs of 8. Kerry needs 100 cans. How many packs should she buy?
   a. 10  
   b. 11  
   c. 12  
   d. 13

Tell About It

Explain how you solved each problem. Show all your work.

21. Val cuts her birthday cake into 10 pieces. Each person had one piece. They ate $\frac{3}{5}$ of the cake. How many people were at Val’s party?

22. How many ways can you arrange in a line a blue triangle, a red triangle, a yellow square, and a green square, if figures with the same shape are not side by side?
Strategy for a Marathon

I will start when the gun goes off.
I will run for five miles.
Feeling good, I will run to the tenth mile.
At the tenth I will say, "Only three more to the halfway."
At the halfway mark, 13.1 miles, I will know fifteen is in reach.
At fifteen miles I will say, "You've run twenty before, keep going."
At twenty I will say, "Run home."

Marnie Mueller

In this chapter you will:
Relate fractions and decimals
Explore tenths and hundredths
Compare, order, add, and subtract decimals
Solve problems by finding a pattern

Critical Thinking/Finding Together
Thirteen and one-tenth is the halfway mark of the marathon. Write this number as a fraction. How long is the marathon?
Fractions and Decimals

You can write a fraction and a decimal to show parts of a whole. A decimal is a number with one or more digits to the right of the decimal point.

Materials: ruler, 1 red and 1 green crayon

Step 1
Draw a square with 10 equal parts, like the square shown. What fractional part of the whole square is each part?

Step 2
Shade 6 parts of your square red. How many tenths are shaded red? Write a fraction to show how many tenths are shaded red.

You can also write a decimal to represent how many tenths are shaded red.

Numbers to the right of the ones digit represent decimals.

One place to the right of the ones place is the tenths place.

Write the decimal as: 0.6

Write a zero before the decimal point to show no ones.

Read $\frac{6}{10}$ and 0.6 as six tenths.

$\frac{6}{10} = 0.6$
Step 1
Draw another square with 10 equal parts.

Step 2
Shade 5 out of the 10 tenths green.

Write a fraction and a decimal to represent the number of tenths shaded.

Write a fraction and a decimal to represent the number of tenths not shaded.

Communicate

1. How are fractions and decimals alike? How are they different? Give an example to support your answer.

Write the decimal for the shaded part of each.

2. 3. 4. 5.

Write as a decimal.

6. \(\frac{5}{10}\) 7. \(\frac{9}{10}\) 8. \(\frac{2}{10}\) 9. \(\frac{3}{10}\) 10. \(\frac{1}{10}\)

11. four tenths 12. six tenths 13. eight tenths
14. seven tenths 15. three tenths 16. one tenth

Write the word name for each.

17. \(\frac{1}{10}\) 18. \(\frac{10}{10}\) 19. 0.5 20. 0.2 21. 0.9

Complete this number line for fractions and decimals.

22.

\[0 \quad 0.1 \quad ? \quad ? \quad 0.5 \quad ? \quad ? \quad ? \quad 1.0\]
Two places to the right of the ones place is the hundredths place.

**Materials:** two 10 × 10 grids, crayons

**Step 1**

Shade 75 out of 100 squares.

Write a fraction to show how many squares are shaded.

How many hundredths are shaded?

You can also write this amount as a decimal.

Write the decimal as: 0.75

Read \( \frac{75}{100} \) and 0.75 as seventy-five hundredths.

**Step 2**

Use another 10 × 10 grid to shade one column of 10 out of 100 squares.

Write a fraction and a decimal to represent the number of columns shaded.

Write a fraction and a decimal to represent the number of squares shaded.

Look at the decimals you wrote to represent your model.

What do you notice about 0.1 and 0.10?

How many hundredths are there in one tenth?
Now shade 9 more columns of the same 10 × 10 grid.

How many columns are shaded now?
How many tenths are there in 1?
How many squares are shaded altogether?
How many hundredths are there in 1?

1. In 0.3 there are ___ ones, ___ tenths, and ___ hundredths.
2. In 0.30 there are ___ ones, ___ tenths, and ___ hundredths.
3. Are these numbers the same? Explain why or why not. Use models to prove your answer.

Write as a decimal.
4. \( \frac{41}{100} \)  
5. \( \frac{95}{100} \)  
6. \( \frac{9}{100} \)  
7. \( \frac{4}{100} \)  
8. \( \frac{33}{100} \)

9. thirty-two hundredths  
10. nine hundredths  
11. forty hundredths

Write the fraction and word name for each.
12. 0.43  
13. 0.99  
14. 0.04  
15. 0.05  
16. 0.90
17. 0.52  
18. 0.87  
19. 0.01  
20. 0.07  
21. 0.60

Write each amount using a dollar sign and decimal point.
22. forty cents  
23. eight cents  
24. two dollars  
25. one dollar and two cents  
26. \( \frac{1}{2} \) of one dollar  
27. \( \frac{3}{4} \) of one dollar
Decimals Greater Than One

Remember:

1 whole + 1 whole = 2 wholes

The mixed number $2 \frac{7}{10}$ can be written as the decimal 2.7.

Write a 2 before the decimal point to show 2 ones.

Read $2 \frac{7}{10}$ and 2.7 as two and seven tenths.

The mixed number $2 \frac{7}{10}$ and the decimal 2.7 name the same amount. You can locate fractions and decimals on a number line.

2.7

Study these examples.

$1 \frac{25}{100} = 1.25$

one and twenty-five hundredths

$1 \frac{6}{100} = 1.06$

one and six hundredths
Write the mixed number and the decimal for each.

1. \[
\begin{array}{c}
\includegraphics[width=0.3\textwidth]{../Images/13_1.png}
\end{array}
\]
2. \[
\begin{array}{c}
\includegraphics[width=0.3\textwidth]{../Images/13_2.png}
\end{array}
\]

Write the decimal and word name for each.

3. \[
2 \frac{\frac{4}{10}}{10}
\]
4. \[
1 \frac{\frac{8}{10}}{10}
\]
5. \[
6 \frac{\frac{1}{10}}{10}
\]
6. \[
3 \frac{\frac{9}{10}}{10}
\]
7. \[
4 \frac{\frac{7}{10}}{10}
\]
8. \[
1 \frac{\frac{2}{10}}{10}
\]
9. \[
2 \frac{\frac{3}{10}}{10}
\]
10. \[
3 \frac{\frac{7}{10}}{10}
\]
11. \[
4 \frac{\frac{8}{10}}{10}
\]
12. \[
5 \frac{\frac{1}{10}}{10}
\]
13. \[
2 \frac{\frac{9}{10}}{10}
\]
14. \[
1 \frac{\frac{5}{10}}{10}
\]
15. \[
4 \frac{\frac{6}{10}}{10}
\]
16. \[
1 \frac{\frac{7}{10}}{10}
\]
17. \[
2 \frac{\frac{3}{10}}{10}
\]
18. \[
1 \frac{\frac{34}{100}}{100}
\]
19. \[
4 \frac{\frac{36}{100}}{100}
\]
20. \[
7 \frac{\frac{28}{100}}{100}
\]
21. \[
5 \frac{\frac{92}{100}}{100}
\]
22. \[
6 \frac{\frac{20}{100}}{100}
\]
23. \[
9 \frac{\frac{90}{100}}{100}
\]
24. \[
8 \frac{\frac{8}{100}}{100}
\]
25. \[
2 \frac{\frac{1}{100}}{100}
\]

Copy and complete each number line.

26. \[
\begin{array}{c}
2.0 \quad 2.1 \quad ? \quad ? \quad ? \quad 2.5 \quad ? \quad ? \quad ? \quad 3.0 \quad ? \quad ? \quad ? \quad ?
\end{array}
\]

27. \[
\begin{array}{c}
3.5 \quad ? \quad ? \quad 3.9 \quad ? \quad ? \quad ? \quad 4.4 \quad ? \quad ? \quad ? \quad ? \quad ? \quad 5.0
\end{array}
\]

Write Yes or No. Explain your answer.

28. Does \[
1 \frac{\frac{10}{10}}{10} = 2.0
\]?
29. Does \[
2 \frac{\frac{5}{100}}{100} = 2.5
\]?
30. Does \[
3 \frac{\frac{1}{10}}{10} = 1.3
\]?
31. Does \[
4.7 = 4 \frac{\frac{7}{10}}{10}
\]?
32. Does \[
6.3 = 3 \frac{\frac{6}{10}}{10}
\]?
33. Does \[
1.93 = 1 \frac{\frac{93}{100}}{100}
\]?

CRITICAL THINKING

3.58 = 3 + 0.5 + 0.08

Find the missing number.

34. \[
1.35 = 1 + ? + 0.05
\]
35. \[
4.91 = 4 + 0.9 + ?
\]
36. \[
6.40 = 6 + 0.4 + ?
\]
37. \[
5.02 = 5 + ? + 0.02
\]
Compare and Order Decimals

You can use models to compare fractions and decimals.

Compare: \( \frac{5}{10} \) ? 0.7

\[ \frac{5}{10} = 0.5 \]

Think

The model for 0.5 has **fewer** bars shaded than the model for 0.7.

So \( \frac{5}{10} < 0.7 \).

You can use a number line to compare decimals.

Compare: 0.8 ? 0.3

0.8 is to the right of 0.3.

0.8 is **greater than** 0.3.

So 0.8 > 0.3.

You can use the place value of the digits to compare decimals.

Compare: 4.99 ? 4.96

- Look at the ones place.
  Compare the digits. \( 4 = 4 \)

- Look at the tenths place.
  Compare the digits. \( 9 = 9 \)

- Look at the hundredths place.
  Compare the digits. \( 9 > 6 \) So 4.99 > 4.96.
Order Decimals

Write in order from least to greatest: 1.21, 1.29, 1.27

- To order decimals, compare the place value of the digits.
  - Compare ones.
  - Compare tenths.
  - Compare hundredths.

1.21, 1.29, 1.27

In order from least to greatest: 1.21, 1.27, 1.29

Order from least to greatest using a number line: 1.7, 1.1, 1.9

In order from least to greatest: 1.1, 1.7, 1.9

Order from least to greatest. You may use a number line.

10. 0.2, \( \frac{8}{10} \), 0.4
11. 1.4, 1.8, 1.2
12. 2.16, 2.13, 2.15
13. 7.0, 7.9, 7.5
14. 3.3, 3.0, 3.7
15. 4.07, 4.04, 4.01

DO YOU REMEMBER?

16. $346 + $398
17. $411 – $183
18. $6.01 – $2.95
19. $7.90 + $2.89
20. $15.75 – $10.89
21. $53.30 + $39.92
On Monday Damon rode his bicycle 2.43 mi. The next day he rode 1.83 mi. How many miles did Damon ride altogether?

To find how many miles altogether, add: \[ 2.43 + 1.83 = ___. \]

Damon rode 4.26 miles altogether.

On Monday Damon's friend Ron rode his bicycle 3.05 mi. How many more miles did Ron ride than Damon?

To find how many more miles, subtract: \[ 3.05 - 2.43 = ___. \]

Ron rode 0.62 more miles than Damon.
Find the sum.

1. 0.2 + 0.5 = 0.7
2. 0.3 + 0.7 = 1.0
3. 0.12 + 0.24 = 0.36
4. 0.35 + 0.27 = 0.62
5. 2.5 + 2.2 = 4.7
6. 1.6 + 3.8 = 5.4
7. 9.2 + 1.6 = 10.8
8. 7.5 + 3.6 = 11.1
9. 3.64 + 2.21 = 5.85
10. 4.55 + 2.75 = 7.3

Find the difference.

11. 4.3 - 2.6 = 1.7
12. 1.7 - 6.2 = -4.5
13. 9.22 - 6.84 = 2.38
14. 2.31 - 4.79 = -2.48
15. 7.92 - 3.95 = 3.97
16. 0.8 - 0.5 = 0.3
17. 1.4 - 0.7 = 0.7
18. 8.0 - 4.3 = 3.7
19. 5.5 - 3.7 = 1.8
20. 5.9 - 4.2 = 1.7
21. 4.55 - 3.05 = 1.5
22. 3.95 - 2.80 = 1.15
23. 4.80 - 3.05 = 1.75
24. 9.43 - 7.76 = 1.67
25. 6.87 - 4.29 = 2.58
26. 7.00 - 2.69 = 4.31
27. 8.27 - 3.19 = 5.08
28. 16.20 - 12.07 = 4.13
29. 63.27 - 15.08 = 48.19
30. 44.06 - 40.42 = 3.64

Complete each table. If the rule is not given, write the rule.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.</td>
<td>1.00</td>
</tr>
<tr>
<td>32.</td>
<td>3.50</td>
</tr>
<tr>
<td>33.</td>
<td>4.25</td>
</tr>
<tr>
<td>34.</td>
<td>4.25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rule: Add 2.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>31.</td>
</tr>
<tr>
<td>32.</td>
</tr>
<tr>
<td>33.</td>
</tr>
<tr>
<td>34.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rule: Subtract 0.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>35.</td>
</tr>
<tr>
<td>36.</td>
</tr>
<tr>
<td>37.</td>
</tr>
<tr>
<td>38.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rule: ___<strong><strong>?</strong></strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>39.</td>
</tr>
<tr>
<td>39.</td>
</tr>
<tr>
<td>39.</td>
</tr>
<tr>
<td>39.</td>
</tr>
</tbody>
</table>

Chapter 13 425
Multiply Money

Rita makes stuffed animals. She sells fluffy bears for $3.89 each. How much will 6 bears cost?

First round to estimate the product:

\[ 6 \times 3.89 \]
\[ 6 \times 4.00 = 24.00 \]

Then to find the cost of 6 bears, multiply:

\[ 6 \times \$3.89 = \_? \_ \]

Follow the same rules for multiplying whole numbers.

\[
\begin{array}{c}
5 \\
5 \\
\end{array}
\begin{array}{c}
\$3.89 \\
\times 6 \\
\_2334 \\
\end{array}
\]

Six bears will cost $23.34.

\[ \text{Think} \]

$23.34 is close to $24.00. The answer is reasonable.

Study these examples.

\begin{align*}
3 \\ x 7 \\
\hline
56.35
\end{align*}

\begin{align*}
7.4 \\ x 8 \\
\hline
23.68
\end{align*}

\begin{align*}
1.1 \\ x 3 \\
\hline
3.34
\end{align*}
Estimate by rounding. Then multiply.

1. \( \$2.24 \times 2 \)  
2. \( \$2.12 \times 3 \)  
3. \( \$1.90 \times 5 \)  
4. \( \$4.50 \times 4 \)  
5. \( \$8.83 \times 8 \)  
6. \( \$6.49 \times 3 \)  
7. \( \$5.02 \times 6 \)  
8. \( \$3.05 \times 7 \)  

Multiply.

9. \( \$0.23 \times 3 \)  
10. \( \$0.34 \times 2 \)  
11. \( \$2.18 \times 4 \)  
12. \( \$3.17 \times 7 \)  
13. \( \$5.05 \times 9 \)  
14. \( \$7.00 \times 5 \)  
15. \( \$9.20 \times 1 \)  
16. \( \$8.01 \times 8 \)  
17. \( \$6.27 \times 6 \)  
18. \( \$3.95 \times 3 \)  
19. \( \$5.59 \times 0 \)  
20. \( \$2.89 \times 1 \)  
21. \( \$8.10 \times 5 \)  
22. \( \$9.03 \times 3 \)  
23. \( \$4.21 \times 7 \)  
24. \( \$7.52 \times 4 \)  
25. \( \$6.42 \times 9 \)  
26. \( \$5.74 \times 6 \)  
27. \( \$8.44 \times 6 \)  
28. \( \$1.75 \times 8 \)  
29. \( 7 \times 0.30 \)  
30. \( 6 \times 9.90 \)  
31. \( 4 \times 5.10 \)  
32. \( 2 \times 7.66 \)

**Problem Solving**

33. Ed makes felt hats for Rita’s stuffed animals. Each hat costs \( \$2.59 \). How much will 8 hats cost?

34. Rita sells stuffed penguins for \( \$6.27 \) each. How much will 7 penguins cost?

35. Rita sells stuffed pigs for \( \$4.59 \) each and stuffed penguins for \( \$6.27 \) each. Karen has \( \$30 \). Does she have enough money to buy 2 stuffed pigs and 3 stuffed penguins?
A store sells 6 snack boxes of cookies for $2.70. How much does one box of cookies cost?

To find how much one box of cookies costs, divide: $2.70 ÷ 6 = ?.

Follow the same rules for dividing whole numbers. Bring up the decimal point. Write the $ sign.

\[
\begin{array}{c c c}
4 & 5 \\
6)\$2.70 \\
-2 & 4 \\
3 & 0 \\
-3 & 0 \\
0 &
\end{array}
\]

One box of cookies costs $.45.

Matt bought 4 bags of bagel chips for $8. How much did one bag of bagel chips cost?

To find how much one bag cost, divide: $8 ÷ 4 = ?.

Write a decimal point and two zeros in the dividend before dividing. Follow the same rules for dividing whole numbers. Bring up the decimal point. Write the $ sign.

\[
\begin{array}{c c c}
2 & 0 & 0 \\
4)\$8.00 \\
-8 \\
0 & 0 \\
-0 \\
0 & 0 \\
-0 \\
0 &
\end{array}
\]

It cost $2.00 for one bag of bagel chips.
Divide and check.

1. $2 \overline{)\$0.48}$
2. $3 \overline{)\$0.66}$
3. $4 \overline{)\$0.80}$
4. $3 \overline{)\$0.60}$
5. $8 \overline{)\$6.72}$
6. $9 \overline{)\$7.47}$
7. $3 \overline{)\$9.63}$
8. $2 \overline{)\$6.48}$
9. $5 \overline{)\$7.20}$
10. $6 \overline{)\$9.30}$
11. $6 \overline{)\$6.36}$
12. $7 \overline{)\$7.28}$
13. $4 \overline{)\$0.20}$
14. $5 \overline{)\$0.35}$
15. $2 \overline{)\$0.92}$
16. $6 \overline{)\$0.96}$
17. $3 \overline{)\$9.42}$
18. $2 \overline{)\$4.62}$
19. $3 \overline{)\$7.47}$
20. $2 \overline{)\$9.14}$
21. $7.56 \div 7$
22. $3.21 \div 3$
23. $6 \div 4$
24. $8 \div 5$

Problem Solving
25. How much is 1 box of raisins?
26. How much is 1 jar of honey?
27. How much is 1 granola bar?
28. How much is 1 can of juice?
29. How much are 2 ice cream bars?
30. Mel buys 4 fruit roll-ups for $3.56. How much will 1 roll-up cost?
31. Paula buys 2 pounds of apples for $1.18. How much will 3 pounds cost?

Snack Shack Sale
- 8 boxes of raisins for $5.20
- 3 granola bars for $3.45
- 6 cans of juice for $3
- 2 jars of honey for $8.48
- 8 ice cream bars for $4

Test Preparation
32. Divide. $5 \overline{)\$1.80}$

A $0.30$  B $0.34$  C $0.36$  D $0.60$
Ten boys were standing in line. Each time 3 boys sat down, one more boy came into the line. If this continues, how many boys will be sitting down when there are 2 boys standing in line?

**Problem-Solving Strategy:** Find a Pattern

**Read**

Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

**Facts:**
- 10 boys standing in line,
- 3 boys sit, 1 boy comes into the line

**Question:** How many boys will be sitting down when there are 2 boys standing in line?

**Plan**

Each time 3 boys sit down, one more boy comes into the line.

Start with 10. Subtract 3, then add 1 until the answer is 2.

Count the number of boys sitting down.

**Think**

The pattern is: subtract 3, add 1.

**Solve**

<table>
<thead>
<tr>
<th>In line</th>
<th>Sitting</th>
<th>One More</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Four groups of 3 boys are sitting. \(4 \times 3 = 12\)

There are 12 boys sitting down.

**Check**

Act out the problem to check your computations.
Find a pattern to solve each problem.

1. A computer solved 3 problems in 0.5 s, 6 problems in 1.0 s, 9 problems in 1.5 s, and so on. How long will it take to solve 21 problems?

   Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

   Facts: 3 problems in 0.5 s
           6 problems in 1.0 s
           9 problems in 1.5 s

   Question: How many seconds will it take to solve 21 problems?

   Make a table and look for a pattern.

<table>
<thead>
<tr>
<th>Problems</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5</td>
<td>?</td>
</tr>
</tbody>
</table>

   Think: The pattern is: count by 3s, add 0.5.

2. If posts are marked each tenth of a mile on a speed-walking route, how many posts does Joel pass if he begins at one and five tenths of a mile and ends at two and two tenths?

3. Wanda walks 1.2 mi on Sunday, 2.2 mi on Monday, 3.2 mi on Tuesday, and so on. How many miles will Wanda walk in all by Friday?

4. What numbers come next in Aileen’s pattern? Explain the pattern.
   2.9, 2.6, 3.6, 3.3, 4.3, 4.0, 5.0, ? , ?

5. Write your own problem modeled on problem 3 or 4. Have a classmate solve it.
13-9

Problem-Solving Applications: Mixed Review

Solve each problem and explain the method you used.

1. April swam 0.6 km. Did she swim more or less than $\frac{1}{2}$ of a kilometer?

2. Each day Cheryl ran 2.5 mi, Kim ran 2.3 mi, and Boreta ran 2.7 mi. Which girl ran the farthest each day?

3. Glen’s first jump was one hundredth less than the class record of 3.06 m. How far did Glen jump?

4. The track team was going to a meet 23.5 miles away. The bus broke down after going 18.3 miles. How far was the team from the meet?

5. Adrian won the race with a time of 58.3 seconds. Adrian beat Chino by 2.7 seconds. What was Chino’s time?

6. Gil ran twice around the 2.9-km path. Sol ran 6.5 km. How much farther does Gil have to run to equal Sol’s distance?

7. A race began 12.3 km from the bridge, crossed the bridge, and ended 13.4 km after the bridge. If the total distance was 26.5 km, how long was the bridge?

Use the table for problems 8–10.

<table>
<thead>
<tr>
<th>Relay Race</th>
<th>Runner</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arman</td>
<td>6.8 s</td>
</tr>
<tr>
<td></td>
<td>Roy</td>
<td>6.2 s</td>
</tr>
<tr>
<td></td>
<td>Tina</td>
<td>6.5 s</td>
</tr>
<tr>
<td></td>
<td>Fran</td>
<td>6.9 s</td>
</tr>
</tbody>
</table>

8. Which relay runner had the slowest time?

9. Whose time was closest to 7.0 seconds?

10. Whose time was between 6.3 and 6.6 seconds?
Choose a strategy from the list or use another strategy you know to solve each problem.

11. There were 8 red flags at the finish line. Jo put 2 blue flags between each of the red flags. How many blue flags did Jo use?

12. Tim runs nine tenths of a mile each day. Ken runs 1.2 mi each day. How many miles will Ken have run when Tim has run 4.5 miles in all?

13. Four sports books cost $8.64. How much does one book cost? How much do six books cost?

14. Sonya and Brian have a total of $9.50. Sonya has $2.50 more than Brian. How much money does each one have?

15. Nick added 2.3 and 6.2 on a calculator. When he saw the sum 10.5 on the display, Nick knew he had not cleared the calculator. What number had not been cleared?

16. Jon and Rich divided some money evenly. After Jon spent $5.75 of his share at a ball game and $3.00 for lunch, he had $1.25 left. How much money did the boys have at first?

17. Carol lives 4.3 km north of the arena. Erin lives 7.2 km south of the arena. How far do the girls live from each other?

18. Write a problem using the information from problem 17. Have a classmate solve it.
Write the fraction and the decimal for each.  (See pp. 416–421.)

1. \[\frac{3}{4}\]  2. \[\frac{2}{5}\]  3. \[\frac{1}{3}\]  4. \[\frac{1}{2}\]

Write as a decimal.
5. one tenth  6. six tenths  7. four tenths  8. nine tenths
9. \[\frac{3}{10}\]  10. \[\frac{5}{10}\]  11. 2 \[\frac{8}{10}\]  12. \[\frac{67}{100}\]
13. \[\frac{2}{100}\]  14. \[\frac{99}{100}\]  15. 3 \[\frac{3}{10}\]  16. 7 \[\frac{9}{100}\]

Write the word name for each.
17. 0.2  18. 0.31  19. 9.7  20. 1.85

Compare. Write <, =, or >.  (See pp. 422–423.)
21. 0.6 \[\text{?}\] 0.8  22. 5.24 \[\text{?}\] 5.22  23. \[\frac{7}{10}\] \[\text{?}\] 0.7

Order from least to greatest.
24. 1.8, 1.3, 1.9  25. 5.16, 5.12, 5.15  26. 0.3, \[\frac{8}{10}\], 0.6

Find the sum or difference.  (See pp. 424–429.)
27. 0.3 \[+0.6\]  28. 0.68 \[+0.29\]  29. 6.07 \[\text{—}1.98\]  30. 90.15 \[\text{—}67.86\]

Multiply or divide.
31. 7 \[\times\] $0.40  32. 5 \[\times\] $3.80  33. $0.84 \[\div\] 4  34. $0.78 \[\div\] 6

Problem Solving
35. Explain and extend the pattern.
   4.1, 3.4, 3.9, 3.2, 3.7, 3, \[?\], \[?\]  (See Still More Practice, p. 470.)
Equivalent Fractions and Decimals

Choose the fraction or decimal that does \textit{not} belong.

1. \( \frac{1}{2}, \frac{2}{4}, 0.5, 5.0 \)
2. \( \frac{2}{3}, \frac{8}{12}, 0.09, \frac{4}{6} \)
3. \( \frac{1}{3}, \frac{3}{9}, \frac{2}{6}, 0.03 \)
4. \( 0.01, \frac{1}{4}, \frac{4}{16}, \frac{2}{8} \)
5. \( 1.0, 0.1, \frac{4}{4}, \frac{10}{10} \)
6. \( 1.0, \frac{1}{10}, 0.1, 0.10 \)
7. \( 1.5, \frac{3}{4}, \frac{11}{2} \)
8. \( \frac{6}{10}, 0.6, \frac{2}{3} \)
9. \( 0.2, 0.02, \frac{1}{2}, 0.20 \)
10. \( 2.5, \frac{1}{4}, 0.25 \)
11. \( 0.92, \frac{92}{100}, \frac{9}{100} \)
12. \( 0.01, \frac{1}{100}, \frac{10}{100} \)

13. Make up your own equivalent fraction and decimal tank.

\[ \frac{2}{4} \]

Use models to find each sum as a fraction.

14. \( 0.6 + \frac{1}{10} = \frac{7}{10} \)
15. \( \frac{6}{10} + 0.3 \)
16. \( 0.07 + \frac{20}{100} \)
17. \( \frac{4}{100} + 0.43 \)
18. \( \frac{2}{10} + 0.8 \)
19. \( 0.05 + \frac{35}{100} \)
20. \( \frac{48}{100} + 0.20 \)
Write the fraction and the decimal for each.

1. \[ \frac{3}{5} \] 2. \[ \frac{5}{6} \] 3. \[ \frac{3}{4} \] 4. \[ \frac{4}{5} \]

Write as a decimal.

5. five tenths 6. \( \frac{61}{100} \) 7. \( \frac{7}{100} \) 8. \( 2 \frac{7}{10} \) 9. \( 9 \frac{1}{100} \)

Write the word name for each.

10. 0.7 11. 0.25 12. 1.4 13. 1.29

Compare. Write <, =, or >.

14. 0.8 ? 0.5 15. 7.42 ? 7.46 16. 0.1 ? \( \frac{1}{10} \)

Find the sum or difference.

17. \( 5.9 - 2.3 \) 18. \( 0.63 - 0.49 \) 19. \( 1.96 + 4.59 \) 20. \( 65.83 + 28.19 \)

Multiply or divide.

21. \( 9 \times \$0.80 \) 22. \( 6 \times \$2.70 \) 23. \( \$0.96 \div 6 \) 24. \( \$3.78 \div 3 \)

Problem Solving

Use a strategy you have learned.

25. What numbers come next in Dave’s pattern?

4.3, 5.1, 4.5, 5.3, 4.7, 5.5, ___, ___

Tell About It

26. Explain the pattern you needed to find to solve exercise 25.

Performance Assessment

27. Make three different decimals by placing cards in the ones and tenths places.

28. Show each decimal you made on a number line. Then write them in order from least to greatest.
# Test Preparation

**Choose the best answer.**

1. What is the place of the underlined digit?
   - 756, 849
   - a. hundreds
   - b. thousands
   - c. ten thousands
   - d. hundred thousands

2. $80.00 - $8.03
   - a. $71.97
   - b. $72.03
   - c. $72.97
   - d. $71.03

3. Which is a meaning of division?
   - a. separating into unequal groups
   - b. sharing equally
   - c. joining together
   - d. all of these

4. Which is greater than 5 meters?
   - a. 50 mm
   - b. 58 dm
   - c. 500 cm
   - d. none of these

5. Which is not a right angle?
   - a. A
   - b. B
   - c. C
   - d. all of these

   - 2 ) $11.91
   - a. $9.00
   - b. $6.00
   - c. $22.00
   - d. $24.00

7. \[ 6379 + 1669 \]
   - a. 7438
   - b. 7948
   - c. 8048
   - d. 8038

8. \[ 8 \times ? = 40\text{c} \]
   - a. 5\text{c}
   - b. 20\text{c}
   - c. 32\text{c}
   - d. 5\text{c}

9. In a pictograph, each \( \bigcirc \) = 4 people. How many people are represented by \( \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \)?
   - a. 5
   - b. 9
   - c. 17
   - d. 18

10. \[ 72 \div 8 = ? \]
    - a. 7
    - b. 8
    - c. 9
    - d. 6

11. Which is a rectangular prism?
    - a. D
    - c. F
    - d. none of these

12. \[ \frac{2}{3} = \frac{?}{6} \]
    - a. 1
    - b. 2
    - c. 4
    - d. 6
13. Which of these is a way to write seven tenths?
   a. 1.7  b. 0.7  c. 0.07  d. \( \frac{7}{9} \)

14. \[ \begin{array}{c}
   6.25 \\
   + 2.78 \\
   \hline
   9.03
   \end{array} \]
   a. 903  b. 9.30  c. 90.3  d. 9.03

15. What kind of transformation is shown?
   a. reflection  b. translation  c. rotation  d. not given

16. A bag of cherries sells for $4.09. A bottle of lemonade sells for $2.25. If Dori buys 3 bags of cherries and 4 lemonades, how much will she spend?
   a. $6.34  b. $12.27  c. $22.27  d. not given

17. \[ \begin{array}{c}
   50.34 \\
   - 37.37 \\
   \hline
   12.97
   \end{array} \]
   a. 12.97  b. 13.07  c. 27.03  d. 87.71

18. \[ \begin{array}{c}
   1071 \\
   \times 8 \\
   \hline
   8568
   \end{array} \]
   a. 1079  b. 8068  c. 8168  d. 8568

19. What decimal is shown above?
   a. 0.16  b. 1.06  c. 1.6  d. 1.16

20. A snack show sells 5 juice packs for $3. How much are 3 juice packs?
   a. $0.18  b. $1.50  c. $1.80  d. $9.00

Tell About It

Explain how you solved each problem. Show your work.

21. Gus left the music store at 5:15 P.M. He spent 3 h 30 min putting prices on new CDs, 45 minutes eating his lunch, and 4 h 15 min stacking CDs on the shelves. What time did Gus get to the store?

22. A 6-oz bag of nuts costs 84¢. Another brand of nuts is sold in an 8-oz bag. It costs 96¢. Which bag of nuts would you buy? Why?
Marvelous Math

How fast does a New York taxi go?
What size is grandpa’s attic?
How old is the oldest dinosaur?
The answer’s in Mathematics!

How many seconds in an hour?
How many in a day?
What size are the planets in the sky?
How far to the Milky Way?

How fast does lightning travel?
How slow do feathers fall?
How many miles to Istanbul?
Mathematics knows it all!

Rebecca Kai Dotlich

In this chapter you will:
Learn about divisibility rules and the order of operations
Explore expressions and variables
Find missing operations
Find common factors
Solve problems by using more than one step

Critical Thinking/ Finding Together

How many days old are you?
Don’t forget about leap years.
### Divisibility

A number is **divisible** by another number if there is no remainder when it is divided by the other number.

\[
20 \div 2 = 10 \\
20 \div 5 = 4 \\
20 \div 10 = 2
\]

Since there are no remainders, 20 is divisible by 2, 5, and 10.

► To find which numbers are divisible by 2, count by 2s starting at 0.

\[
0 2 4 6 8 10 12 14 16 18 20
\]

Look at the digits in the ones place. What pattern do you see? Any number ending in 0, 2, 4, 6, or 8 is divisible by 2.

► To find which numbers are divisible by 5, count by 5s starting at 0.

\[
0 5 10 15 20 25 30 35 40 45 50
\]

Look at the digits in the ones place. What pattern do you see? Any number ending in 0 or 5 is divisible by 5.

► To find which numbers are divisible by 10, count by 10s starting at 0.

\[
0 10 20 30 40 50
\]

Look at the digits in the ones place. What pattern do you see? Any number ending in 0 is divisible by 10.
Is the number divisible by 2? Explain.

1. 8   2. 17   3. 31   4. 56   5. 100


Is the number divisible by 5? Explain.

11. 19  12. 40  13. 85  14. 86  15. 100

16. 125  17. 137  18. 190  19. 1005  20. 4444

Is the number divisible by 10? Explain.

21. 16  22. 20  23. 40  24. 56  25. 99

26. 100  27. 140  28. 265  29. 3006  30. 4200

Is the number divisible by 2, 5, or 10? Write yes or no.

<table>
<thead>
<tr>
<th>Divisible by</th>
<th>45</th>
<th>50</th>
<th>72</th>
<th>91</th>
<th>102</th>
<th>225</th>
<th>4010</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.</td>
<td>2</td>
<td>no</td>
<td>?</td>
<td>?</td>
<td>yes</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>32.</td>
<td>5</td>
<td>yes</td>
<td>?</td>
<td>not</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>33.</td>
<td>10</td>
<td>?</td>
<td>yes</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Problem Solving

34. I am a number between 42 and 48. I am divisible by 5. What number am I?

35. I am a number between 51 and 67. I am divisible by 10. What number am I?

36. I am a number that is divisible by 2. I have two digits. One digit is a 6 and one digit is a 9. What number am I?

37. I am a number that is divisible by 5. I have three digits. I am between 121 and 129. What number am I?
Expressions and Variables

Vicki picked 27 red apples and 32 yellow apples. To show how many red and yellow apples she picked, Vicki wrote this expression:

\[ 27 + 32 \]

An expression is a mathematical phrase that has only numbers and operation signs. It doesn’t have an equal sign.

Each of the following is an expression:

\[ 710 - 55 \quad 8 \times 4 \quad 12,378 + 3,720 \quad 84 \div 4 \]

Suppose Vicki also picked some green apples but didn’t have a chance to count them. She could use a variable to stand for the unknown number of green apples.

A variable is a letter or symbol that stands for an unknown number.

To show the total number of apples picked, Vicki wrote:

\[ 27 + 32 + n \]

Study these examples.

You can write an expression for a given situation.

<table>
<thead>
<tr>
<th>Word Phrase</th>
<th>Expression</th>
<th>Word Phrase</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 divided by 5</td>
<td>( 75 \div 5 )</td>
<td>the sum of 15 and a number</td>
<td>( 15 + n )</td>
</tr>
<tr>
<td>16 less than 482</td>
<td>( 482 - 16 )</td>
<td>0.5 subtracted from 7.2</td>
<td>( 7.2 - 0.5 )</td>
</tr>
<tr>
<td>3 times 45</td>
<td>( 3 \times 45 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 less than a number</td>
<td>( n - 5 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Write whether each is an expression or a number sentence.
1. $50 \div 10 = 5$  
2. $7 \times 52$  
3. $4 + 8 = 12$  
4. $n - 7$

Write an expression for each word phrase. Use the letter $n$ as a variable for any unknown number.
5. 25 more than 678  
6. eighty divided by ten
7. 3 times seven  
8. 9 added to a number
9. 2 times a number  
10. 8 subtracted from thirty
11. 20 added to 86.5  
12. 32 less than a number
13. 10,732 plus fifty  
14. fifteen divided by five
15. 22 subtracted from 76.80  
16. 8.2 minus a number
17. a difference of 100 and 27  
18. the sum of 7.4 and 9.2

Problem Solving

Write an expression for each situation.
19. Mr. Norman buys 15 crates of pears on Monday and 22 crates of pears on Tuesday. How many crates of pears did he buy in all?
20. Joan has some bananas. Then she eats 2 of them. How many bananas does she have left?

A variable can stand for more than one number when a sentence contains the symbol $<$ or $>$.

21. If $4 + n > 10$, write all of the numbers from the list below that $n$ could be: $5 \ 8 \ 6 \ 9$
Artie is playing a math game on his computer. He has to simplify the expression, $3 \times 6 - 5$, to earn three points.

When a problem has more than one operation, simplify using the order of operations.

Order of Operations
- Multiply or divide in order from left to right.
- Add or subtract in order from left to right.

**Simplify** $3 \times 6 - 5$

1. First multiply $6$ by $3$.
2. Then subtract $5$ from $18$.

$$3 \times 6 - 5 = 18 - 5 = 13$$

**Simplify** $16 - 8 + 3$

1. No multiplication or division. So work from left to right.
2. First divide $16$ by $2$.
3. Next multiply $3$ by $5$.
4. Then subtract $15$ from $25$.

$$16 - 8 + 3 = 8 + 3 = 11$$

**Study this example.**

1. First divide $10$ by $2$.
2. Next multiply $3$ by $5$.
3. Then subtract $15$ from $25$.

$$25 - 10 \div 2 \times 3 = 25 - 5 \times 3 = 25 - 15 = 10$$
Write the operation that should be done first.
1. $8 + 3 - 4$  
2. $24 - 9 + 1$  
3. $26 - 3 \times 8$  
4. $12 + 4 \times 2$  
5. $18 \div 9 + 4$  
6. $5 - 2 \div 1$  
7. $15 \div 3 \times 2$  
8. $10 \times 4 \div 2$  
9. $4 + 10 - 3 \times 3$  
10. $6 \times 5 + 2 - 1$  
11. $7 + 8 - 6 \div 2$  
12. $9 - 2 + 8 \div 4$

Choose the correct solution.
13. $12 - 2 \times 3 + 1$  
   a. 31  
   b. 7  
   c. 4  
14. $8 - 4 + 3 \times 5$  
   a. 5  
   b. 19  
   c. 35
15. $40 \div 4 + 6 - 2$  
   a. 14  
   b. 5  
   c. 2  
16. $36 \div 9 - 3 + 6$  
   a. 12  
   b. 3  
   c. 7

Use the order of operations to simplify.
17. $10 - 3 + 2$  
18. $6 + 9 - 7$  
19. $3 + 2 \times 8$  
20. $5 \times 8 + 9$  
21. $7 - 2 \times 3$  
22. $9 \times 4 - 2$  
23. $48 \div 6 + 2$  
24. $8 + 8 \div 4$  
25. $70 - 63 \div 9$  
26. $25 - 20 \div 5$  
27. $16 \div 2 \times 2$  
28. $8 \times 10 \div 2$  
29. $7 + 6 \times 6 - 5$  
30. $6 \times 8 + 3 - 2$  
31. $28 \div 4 + 6 - 2$

When a problem involves parentheses, compute within parentheses first. Then follow the order of operations.

Simplify.
32. $(6 - 3) \times 2$  
33. $(3 + 5) \times 2$  
34. $4 \times (3 + 2)$  
35. $40 \div (10 - 5)$  
36. $16 \div (2 + 6)$  
37. $(20 - 12) \div 4$
Jane and Vinny are playing a number game. Jane says, “I am thinking of the numbers 8 and 7. The answer is 56. What operation did I use?”

Use Guess and Test to find the missing operation.

\[8 \bigcirc 7 = 56\]

Think: 56 is greater than both 8 and 7. So guess addition or multiplication.

Test: \[8 + 7 = 56\] not true

\[8 \times 7 = 56\] true

Jane used multiplication to find the answer.

Find the missing operation.

\[10 \bigcirc 4 = 6\]

Think: 6 is not less than 4, but 6 is less than 10. So guess subtraction or division.

Test: \[10 - 4 = 6\] true

\[10 \div 4 = 6\] not true

Subtraction completes the number sentence.

Write + or – to complete.

1. \[3 \bigcirc 7 = 10\]  
2. \[1 \bigcirc 5 = 6\]  
3. \[8 \bigcirc 5 = 3\]  
4. \[9 \bigcirc 9 = 18\]  
5. \[7 \bigcirc 7 = 0\]  
6. \[7 \bigcirc 5 = 2\]  
7. \[6 \bigcirc 5 = 11\]  
8. \[5 \bigcirc 2 = 3\]
Write $\times$ or $\div$ to complete.
9. $8 \bigodot 4 = 32$  10. $81 \bigodot 9 = 9$  11. $16 \bigodot 2 = 8$  12. $3 \bigodot 6 = 18$
13. $6 \bigodot 8 = 48$  14. $36 \bigodot 4 = 9$  15. $5 \bigodot 5 = 1$  16. $9 \bigodot 2 = 18$

Write $+, -, \times,$ or $\div$.
17. $5 \bigodot 8 = 13$  18. $40 \bigodot 8 = 5$  19. $3 \bigodot 3 = 9$  20. $7 \bigodot 3 = 4$
21. $7 \bigodot 6 = 42$  22. $6 \bigodot 4 = 24$  23. $36 \bigodot 6 = 6$  24. $9 \bigodot 6 = 15$
25. $8 \bigodot 2 = 6$  26. $9 \bigodot 9 = 0$  27. $16 \bigodot 4 = 4$  28. $7 \bigodot 2 = 9$
29. $8 \bigodot 2 = 4$  30. $54 \bigodot 6 = 9$  31. $8 \bigodot 7 = 15$  32. $8 \bigodot 8 = 1$
33. $21 \bigodot 7 = 3$  34. $23 \bigodot 3 = 20$  35. $2 \bigodot 12 = 24$  36. $3 \bigodot 10 = 30$
37. $55 \bigodot 5 = 11$  38. $80 \bigodot 8 = 10$  39. $80 \bigodot 8 = 72$  40. $80 \bigodot 8 = 88$
41. $6 \bigodot 15 = 90$  42. $9 \bigodot 25 = 34$  43. $3 \bigodot 28 = 84$  44. $100 \bigodot 4 = 25$
45. $65 \bigodot 7 = 58$  46. $90 \bigodot 7 = 97$  47. $96 \bigodot 8 = 12$  48. $3 \bigodot 78 = 234$

Problem Solving
49. Write a number sentence that can be solved using more than one operation.

50. Write a number sentence that can be solved using addition or multiplication.

Critical Thinking
Which of these number sentences has more than one answer? Why?
51. $3 \bigodot 2 = 6$  52. $0 \bigodot 1 = 0$  53. $8 \bigodot 1 = 8$  54. $2 \bigodot 1 = 2$
You can use multiplication sentences to find all the factors of a number.

Find all the factors of 12.

- $1 \times 12 = 12$
- $2 \times 6 = 12$
- $3 \times 4 = 12$

The factors of 12 are 1, 2, 3, 4, 6, and 12.

Common factors are numbers that are factors of two or more products.

Find all the common factors of 12 and 18.

First find the factors of each number.

- $1 \times 12 = 12$
- $1 \times 18 = 18$
- $2 \times 6 = 12$
- $2 \times 9 = 18$
- $3 \times 4 = 12$
- $3 \times 6 = 18$

Then list the common factors.

1, 2, 3, 6

The common factors of 12 and 18 are 1, 2, 3, and 6.
On grid paper, draw rectangles to represent each number.
1. 16 2. 24 3. 20

4a. How many different rectangles did you find for each number in exercises 1–3?
b. What are all the factors of each number?

List all the factors of each number. You may use multiplication sentences.
5. 10 6. 9 7. 15 8. 21 9. 14
10. 27 11. 25 12. 35 13. 40 14. 45

List all the common factors of each set of numbers.
15. 2 and 6 16. 4 and 8 17. 5 and 10
18. 9 and 15 19. 6 and 15 20. 8 and 12
21. 6 and 12 22. 12 and 16 23. 12 and 24
24. 15 and 25 25. 20 and 4 26. 3 and 21

27. Look at the common factors for exercises 15–26. What number is a common factor in every set of numbers? Why?

28. How many factors can you list to make these number sentences true?
0 = ? × ?
1 = ? × ?
Look at the balance. There are two ways to make the expressions on each side equal in value.

- First find the value of the expression on the left side of the balance.
  
- Then look at the expression on the right side of the balance. Use guess and test to find the missing operation and number. There may be more than one way to make 36.

\[
\begin{align*}
86 - 40 - 10 &= 3 \times n \\
36 &= 3 \times n \\
36 &= 3 + 33 \\
36 &= 36
\end{align*}
\]

\[
\begin{align*}
86 - 40 - 10 &= 3 \times n \\
36 &= 3 \times n \\
36 &= 3 \times 12 \\
36 &= 36
\end{align*}
\]

\begin{align*}
+ 33 \text{ or } \times 12 \text{ will make the expressions equal.}
\end{align*}

**Find two ways to make the sides equal in value.**

1. \(45 - 20 - 1 = 6 \times n\)
2. \(312 - 311 = 5 \times n\)

3. \(405 - 400 = 25 \times n\)
4. \(17 + 3 - 12 = 4 \times n\)

5. \(10 + 20 + 5 = 7 \times n\)
6. \(172 - 140 = 8 \times n\)

7. \(717 - 710 + 2 = 18 \times n\)
8. \(625 - 615 = 50 \times n\)
More Than One Answer

Sentences with < or > can have more than one answer.

What whole numbers make $201 + n < 204$ true?

<table>
<thead>
<tr>
<th></th>
<th>201 + 1</th>
<th>201 + 2</th>
<th>201 + 3</th>
<th>202</th>
<th>203</th>
<th>204</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 204</td>
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<td>&lt; 204</td>
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<tr>
<td>true</td>
<td>true</td>
<td>true</td>
<td>true</td>
<td>false</td>
<td>false</td>
<td>true</td>
</tr>
</tbody>
</table>

So 1 and 2 make $201 + n < 204$ true.

What whole numbers make $60 > 20 \times n$ true?

<table>
<thead>
<tr>
<th></th>
<th>60 &gt; 20 \times 0</th>
<th>60 &gt; 20 \times 1</th>
<th>60 &gt; 20 \times 2</th>
<th>60 &gt; 20 \times 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>true</td>
<td>true</td>
<td>true</td>
<td>true</td>
<td>false</td>
</tr>
</tbody>
</table>

So 0, 1, and 2 make $60 > 20 \times n$ true.

Find whole numbers that make each sentence true.

9. $317 - n > 150 + 160$
10. $12 - 8 < n \div 3$
11. $85 + n < 180 \div 2$
12. $14 \times 7 > 28 + n$
13. $210 \div 3 > n - 14$
14. $400 - n > 5 \times 60$
15. $98 + 55 < n + 140$
16. $240 \div 8 < n \times 3$

TEST PREPARATION

17. What number makes this number sentence true?

$300 + 50 = n \times 5$

A 60   B 70   C 80   D 90


Problem-Solving Strategy: Use More Than One Step

In making a sign for a holiday sale, Mr. Thrifty wants to use one of these words: GREAT, HUGE, GIANT, or LARGE. After looking at the price of each letter, which word will he use if he wants to spend the least amount of money?

**Facts:**
- the words — GREAT, HUGE, GIANT, LARGE
- the price of each letter

**Question:** Which word will cost the least amount of money?

**Plan:**
- Find the price of each letter on the table.
- Add the price of each letter in each word.
- Order the cost of the words.

**Solve:**

<table>
<thead>
<tr>
<th>Letter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6¢</td>
</tr>
<tr>
<td>E</td>
<td>8¢</td>
</tr>
<tr>
<td>G</td>
<td>9¢</td>
</tr>
<tr>
<td>H</td>
<td>6¢</td>
</tr>
<tr>
<td>I</td>
<td>2¢</td>
</tr>
<tr>
<td>L</td>
<td>4¢</td>
</tr>
<tr>
<td>N</td>
<td>6¢</td>
</tr>
<tr>
<td>R</td>
<td>11¢</td>
</tr>
<tr>
<td>T</td>
<td>4¢</td>
</tr>
<tr>
<td>U</td>
<td>11¢</td>
</tr>
<tr>
<td>G</td>
<td>9¢</td>
</tr>
<tr>
<td>A</td>
<td>6¢</td>
</tr>
<tr>
<td>E</td>
<td>8¢</td>
</tr>
<tr>
<td>H</td>
<td>6¢</td>
</tr>
<tr>
<td>I</td>
<td>2¢</td>
</tr>
<tr>
<td>N</td>
<td>6¢</td>
</tr>
<tr>
<td>T</td>
<td>4¢</td>
</tr>
<tr>
<td>L</td>
<td>4¢</td>
</tr>
<tr>
<td>A</td>
<td>6¢</td>
</tr>
<tr>
<td>R</td>
<td>9¢</td>
</tr>
<tr>
<td>E</td>
<td>8¢</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Word</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREAT</td>
<td>38¢</td>
</tr>
<tr>
<td>HUGE</td>
<td>34¢</td>
</tr>
<tr>
<td>GIANT</td>
<td>27¢</td>
</tr>
<tr>
<td>LARGE</td>
<td>38¢</td>
</tr>
</tbody>
</table>

34¢ < 38¢ and 27¢ < 34¢, so GIANT will cost the least amount of money.

**Check:**
- Change the order of the addends to check the cost of each word.
Use more than one step to solve each problem.

1. Hector doubled $1.89 and then found 2 nickels. Rosa doubled $2.06 and then lost a quarter. Who had more money?

   Visualize yourself in the problem above as you reread it. Focus on the facts and the question.

   **Facts:** Hector doubled $1.89 and found 2 nickels. Rosa doubled $2.06 and lost a quarter.

   **Question:** Who had more money?

   To double $1.89, multiply by 2. Then add 10¢. To double $2.06, multiply by 2. Then subtract 25¢.

2. A store owner bought 8 kites for $52.72. Then she sold each kite for $6.89. Did the store owner gain or lose money? How much did she gain or lose?

3. The weight of 10 feet of copper wire is 12 ounces. If Jeff’s science project requires three pieces of 8-foot copper wire and two pieces of 18-foot copper wire, how many ounces must Jeff buy?

4. The width of a rectangle is 24 m. If the length of the rectangle is 2 m more than the width, what is the perimeter?

5. Write a problem that requires more than one step to solve. Have a classmate solve it.
14-8

Problem-Solving Applications: Mixed Review

Read Plan Solve Check

Solve each problem and explain the method you used.

1. Mr. Farmer’s silo had 23,200 ears of corn. During the winter his pigs ate 12,375 ears. How many ears of corn were left?

2. A large poultry farm produced one million, nine hundred thousand eggs. How many more eggs are needed to reach a goal of 2,000,000?

3. A beekeeper placed 17,500 hives in cherry groves and 13,800 hives in almond groves. How many hives did the beekeeper place in all?

4. Jen’s orchard produced 985 red apples and 1126 green apples. What color apples can she divide evenly between 5 stores? between 2 stores?

5. Mr. MacDonald divided his 48 acres of farmland equally among his 3 children. One son planted wheat on 9 of his acres and soybeans on the rest. How many acres of soybeans did he plant?

6. Lauren spent $3.73 at a produce stand. She paid with a $5.00 bill. She received a dollar bill, a quarter, and 2 nickels as change. Was this correct? Explain.

7. Each basket of strawberries costs $1.59. How much will 9 baskets cost?

8. Arlene spent $73.28 for 4 bushels of pineapples. What is the cost of 1 bushel?
Choose a strategy from the list or use another strategy you know to solve each problem.

9. Spot and King are two farm dogs. Spot is 4 years old. King is 12 years old. In how many years will King be twice Spot’s age?

10. A farmer had 21 bales of hay. A week later she had 5 bales left. If she put the same number of bales into each of 8 stalls, how many bales would be in each stall?

11. A rancher sold half of her sheep. After buying 12 more, she had 21 sheep. How many sheep did she have at first?

12. What is the sum of the following numbers: 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, and 9000?

13. How many cartons will a farmer need for shipping 330 cantaloupes if exactly 8 cantaloupes are packed into each full carton?

14. Carly has 1.8 kg of apples and 2.3 kg of berries. How many more kilograms of berries than apples does Carly have?

15. There are 10 rows of 6 trees in the orchard. Every fifth tree is pruned. How many trees still need to be pruned?

16. A gardener bought a plant that was 35 cm tall. Each time he cut it back 2 cm, it grew another 5 cm. If he cut it back four times, how tall would the plant be?
Check Your Progress
Lessons 1–8

Write an expression for each word phrase. (See pp. 442–443.)

1. seventeen plus 36  
2. 4 times 55  
3. 278 divided by 5  
4. 28 less than a number  
5. a number added to 19.5

Simplify each expression. (See pp. 444–445.)

6. \(9 \times 5 + 8 - 3\)  
7. \(32 \div 4 + 5 - 3\)  
8. \(7 \times 6 \div 2\)  
9. \(50 - 32 \div 8\)

Write +, –, × or ÷ to complete. (See pp. 446–447.)

10. \(60 \bigcirc 8 = 52\)  
11. \(84 \bigcirc 6 = 14\)  
12. \(4 \bigcirc 70 = 280\)  
13. \(9 \bigcirc 44 = 53\)  
14. \(210 \bigcirc 7 = 30\)  
15. \(3 \bigcirc 18 = 54\)

List all the factors of each number. You may use multiplication sentences. (See pp. 448–449.)

16. 30  
17. 28  
18. 16  
19. 42

List all the common factors.

20. 3 and 12  
21. 4 and 32  
22. 9 and 15

Find two ways to make the sides equal in value. (See pp. 450–451.)

23. \(253 + 347 = 4 \bigcirc n\)  
24. \(111 + 43 = 7 \bigcirc n\)

Find whole numbers that make each sentence true.

25. \(35 \div 7 > n + 0\)  
26. \(6 \times 5 > 8 \times n\)  
27. \(18 - 9 < n \div 3\)  
28. \(10 \times 9 > n + 75\)

Problem Solving (See pp. 440–441.)

29. I am a number between 51 and 61. I am divisible by 5 and 10. What number am I? (See Still More Practice, p. 470.)
Always, Sometimes, Never

The sentences below are called mathematical statements. A statement is either always true, sometimes true, or never true.

Be careful when testing each statement. Try several examples before you answer.

Write always, sometimes, or never for each statement. Give an example to support your answer.

1. The sum of two odd numbers is an even number.

2. The product of two even numbers is an even number.

3. If you multiply an even number by 5, the ones digit in the product is 0.

4. The sum of an odd number and an even number is an even number.

5. When factors are doubled, their product is doubled.

6. When addends are doubled, their sum is doubled.

7. The product of two odd numbers is an odd number.

8. Rectangles have 4 sides and 4 right angles.

9. Curved figures are circles.

10. Pentagons have seven sides.

11. Rectangles are squares.

12. A circle has 4 edges.
Chapter 14 Test

Simplify.
1. \(7 + 20 - 9 \div 3\)  
2. \(7 \times 3 - 4 + 6\)  
3. \(40 - 5 \times 6\)

List all the common factors.
4. 5 and 30  
5. 6 and 42  
6. 7 and 28

Write an expression for each word phrase.
7. a number plus 17  
8. 4 times sixteen  
9. 45 divided by 5
10. 2.8 less than a number  
11. a number added to 27,910

Find two ways to make the sides equal in value.
12. \(68 + 34 = 6 \circ n\)  
13. \(177 + 255 = 8 \circ n\)

Find two whole numbers that make each sentence true.
14. \(16 - 8 < n \div 4\)  
15. \(7 \times 5 > n + 15\)

Problem Solving

Use a strategy you have learned.
16. I am a number between 61 and 79.  
   I am divisible by 2, 5, and 10.  
   What number am I?

Tell About It

Explain how to solve.
17. The width of a rectangle is 18 m. If the length of the rectangle is 4 m more than the width, what is the perimeter?

Performance Assessment

Use these cards to complete 16 \(\circ 8 \circ 2\).
18. Which two cards give an answer greater than 100?
19. Which two cards give an answer between 10 and 30?
CHAPTER 1

Practice 1-1
Write the number in standard form.
1. 200 + 60 + 3
2. 4 thousands 5 hundreds 0 tens 2 ones
3. 3 hundred thousands

In what place is the underlined digit?
4a. 7159  b. 404,712  c. 23,862

What is the value of the underlined digit?
5a. 193,215  b. 7966  c. 104,638

Compare. Write < or >.
6a. 43 ? 147  b. 213 ? 231
7a. 1976 ? 1979  b. $5.88 ? 5.86

Write in order from least to greatest.
8a. 299, 295, 305  b. 5631, 6501, 5650

Practice 1-2
Write the number in expanded form.
1. Two hundred fifty-four
2. One thousand, three hundred ten
3a. 523,014  b. 709,205

Compare. Write < or >.
4a. 7215 ? 8031  b. 9001 ? 5999
5a. 61,350 ? 62,530  b. 44,323 ? 41,423
6a. 520,959 ? 521,559  b. 370,227 ? 370,127

Round to the nearest ten and nearest hundred.
9a. 639  b. 112  c. 435

Round to the nearest dollar.
10a. $7.73  b. $4.25  c. $6.56

Write the missing numbers.
11. 26, 29, 32, ? , ? , 41, ?

Write the amount.
12. 2 ten-dollar bills, 3 pennies
13. 5 one-dollar bills, 5 dimes, 2 nickels

Problem Solving
14. Cal has 1 one-dollar bill, 3 quarters, and 1 dime. How much money does Cal have?
15. Claire has $4.86. Frank has $4.68. Who has more money?
16. Carol buys a ball for 59¢. She gives the cashier 3 quarters. Name the change.

Round to the nearest thousand.
7a. 2402  b. 5764
8a. 3515  b. 4029

Write the amount.
9. 1 five-dollar bill, 2 dimes, 4 pennies
10. 2 ten-dollar bills, 1 half-dollar, 2 nickels
11. 2 ten-dollar bills, 1 five-dollar bill, 3 quarters, 7 pennies
CHAPTER 2

Practice 2-1

Regroup for addition.

1. 14 tens = ? hundred ? tens
2. 13 hundreds = ? thousand ? hundreds

Add mentally. Look for tens or one hundred.

3a. 55  b. 44  c. 36
    +17   +29   +75

Estimate. Then add.

4a. 82  b. 604  c. 158
    +47   +126  +326

5a. 308  b. 605  c. 432
    +93   +97   +69

6a. 757  b. $1.46  c. $4.07
    +153  +3.93  +3.86

Practice 2-2

Find the missing addend.

1a. 7 + ? = 16  b. 13 = ? + 7

Estimate. Then add.

2a. 7082  b. 5242  c. 6919
    +2181  +1837  +2082

3a. 4557  b. $19.86  c. $27.59
    +4846  +23.75  +47.98

4a. 34  b. 32  c. 302
    94  85  193
    +99  +18  +45

5a. 562  b. $2.16  c. $5.21
    308  3.75  3.96
    +61  +2.30  +4.19

6a. 49,128  b. 37,982
    +16,493  +29,416

Problem Solving

7. Jeanna has 62 baseball cards. Bud has 45 baseball cards. How many baseball cards do they have in all?
8. Peggy has 28 wide-tip markers and 7 fine-tip markers. How many markers does she have in all?
10. Ben spent $4.73 on paper and $3.84 on tape. How much did he spend in all?
11. Amy spent $6.09 in one store and $2.91 in another store. How much did she spend altogether?
12. Stacey has 36 tapes. Jeff has 17 more than Stacey. How many tapes do they have in all?

Problem Solving

7. The Reilly family traveled 452 miles one day and 189 miles the next day. How many miles did they travel in all?
8. A chef prepared 285 lunches and 145 dinners. How many meals did she prepare altogether?
9. Mike put 125 roses and 385 tulips on the truck. How many flowers in all did he put on the truck?
10. Tricia spent $4.36. Anil spent $2.89 more than Tricia. How much money did Anil spend?
11. A poster costs $24.75. The frame costs $19.95. What is the total cost?
CHAPTER 3

**Practice 3-1**

Regroup for subtraction.

1. 4 hundreds 6 tens = ? hundreds ? tens
2. 7 hundreds 9 tens = ? hundreds ? tens
3. 4 dollars 7 dimes = ? dollars ? dimes

Estimate. Then subtract.

4a. 35
   b. 49
c. 67
   
   24
   30
   38

5a. 48
   b. 75¢
c. 87¢
   
   19
   28¢
   69¢

6a. 486
   b. 597
c. $6.58
   
   124
   280
   4.16

7a. $9.89
   b. 783
c. 539
   
   4.17
   692
   347

**Practice 3-2**

Estimate. Then subtract.

1a. $4.36
   b. $5.67
c. $7.58
   
   2.47
   2.89
   4.29

2a. 500
   b. 800
c. $9.00
   
   449
   376
   4.53

3a. 3641
   b. 8975
c. $47.65
   
   2530
   7243
   36.04

4a. 6840
   b. 7936
c. 6348
   
   5673
   4879
   4769

5a. 81,423
   b. 59,465
   
   3,987
   21,846

Align and subtract. Check by adding.

6a. 36 – 29
   b. 84 – 58
7a. $4.00 – $2.79
   b. 523 – 395

**Problem Solving**

8. Liz made 34 banners. She sold 19 of them. How many banners are left?

9. The Westwood School has 473 students. There are 292 boys. How many girls are there?

10. A dairy farmer has 325 cows. He has 175 brown cows. How many cows are not brown?

11. Ramon walked 33 miles the first week. He walked 22 miles the second week. How many more miles did he walk the first week?

12. Fran wanted to spend only about $12. She bought a bat for $8.79. She bought a ball for $2.99. Did Fran spend about $12?

8. Jude’s book has 208 pages. He has read 162 pages. How many more pages are left to read?

9. The scouts are collecting cans. They collected 112 on Saturday and 163 on Sunday. Their goal is 500 cans. How many more cans do they need?

10. A living room set costs $800. Mrs. Borelli has saved $735. How much more money does she need?

11. Amy bought a book for $3.75. How much change did she receive from $5.00?

12. On Thursday the town recycled 3250 pounds of newspaper. On Friday 1189 pounds were recycled. How many fewer pounds were recycled on Friday?
CHAPTER 4

Practice 4-1

Write a multiplication sentence for each.
1a. \(2 + 2 + 2 + 2\)  
   \(b. \ 5 + 5 + 5 + 5\)

Multiply.
2a. \(2 \times 1\)  
   \(b. \ 4 \times 0\)  
   \(c. \ 5 \times 5\)
3a. \(3 \times 7\)  
   \(b. \ 4 \times 9\)  
   \(c. \ 2 \times 0\)

Find the product.
4a. \(3 \times 1\)  
   \(b. \ 4 \times 2\)  
   \(c. \ 6 \times 3\)
5a. \(5 \times 4\)  
   \(b. \ 6 \times 2\)  
   \(c. \ 5 \times 0\)
6a. \(8 \times 4\)  
   \(b. \ 3 \times 5\)  
   \(c. \ 6 \times 4\)
7a. \(10 \times 3\)  
   \(b. \ 4 \times 5\)  
   \(c. \ 2 \times 4\)
8a. \(9 \times 5\)  
   \(b. \ 7 \times 2\)  
   \(c. \ 4 \times 3\)
9a. \(6 \times 5\)  
   \(b. \ 7 \times 4\)  
   \(c. \ 9 \times 3\)

Find the missing factor.
10a. \(? \times 4 = 24\)  
   \(b. \ 7 \times ? = 21\)
11a. \(? \times 5 = 40\)  
   \(b. \ 32 = ? \times 4\)

Problem Solving

12. There are 10 rows of stamps. Each row has 4 stamps. How many stamps are there?
13. There are 5 children. Each child has 3 tapes. How many tapes are there?
14. Rose buys 4 bags of apples with 3 apples in each bag and 3 bags with 4 apples in each bag. How many apples does she buy in all?
15. Pepe worked 4 hours every day for 5 days. How many hours did he work in all?
16. Tom walks 2 miles a day for 5 days and 3 miles a day for 6 days. How many miles does Tom walk in all?
17. Tony reads 2 stories each day. How many stories does he read in 4 days?

CHAPTER 5

Practice 5-1

Find the quotient.
1a. \(4 \div 2\)  
   \(b. \ 3 \div 3\)  
   \(c. \ 8 \div 4\)
2a. \(18 \div 3\)  
   \(b. \ 12 \div 4\)  
   \(c. \ 3 \div 1\)
3a. \(0 \div 3\)  
   \(b. \ 8 \div 2\)  
   \(c. \ 24 \div 3\)

Divide.
4a. \(2 \div 12\)  
   \(b. \ 3 \div 27\)  
   \(c. \ 3 \div 9\)
5a. \(4 \div 16\)  
   \(b. \ 3 \div 15\)  
   \(c. \ 2 \div 10\)
6a. \(2 \div 18\)  
   \(b. \ 4 \div 20\)  
   \(c. \ 4 \div 40\)
7a. \(5 \div 50\)  
   \(b. \ 4 \div 36\)  
   \(c. \ 2 \div 16\)
8a. \(4 \div 24\)  
   \(b. \ 3 \div 21\)  
   \(c. \ 5 \div 40\)

Problem Solving

9. There are 30 desks in 3 rows. At most, how many desks are in each row?
10. Sixteen oranges are shared equally among 4 children. How many oranges does each child get?
11. Zelda has 15 stickers. She buys 30 more stickers. How many groups of 5 stickers can she make?
12. Joe has 12 pieces of art paper. It takes 2 pieces of paper to make a plane. How many planes can Joe make?
13. Charlie has a string 35 feet long. He must cut it into 5 equal pieces. How long is each piece?
CHAPTER 6

Practice 6-1
Find the product.
1a. 6 × 6  b. 2 × 7  c. 8 × 6
2a. 4 × 6  b. 6 × 7  c. 5 × 6
3a. 4 × 7  b. 0 × 6  c. 8 × 7
4a. 7  b. 7  c. 6
Find the quotient.
5a. 0 ÷ 6  b. 35 ÷ 7  c. 24 ÷ 6
6a. 7 ÷ 7  b. 54 ÷ 6  c. 14 ÷ 7
7a. 30 ÷ 6  b. 49 ÷ 7  c. 21 ÷ 7
8a. 7)56  b. 6)18  c. 7)28
9a. 6)48  b. 7)63  c. 6)6

Find the product.
1a. 9 × 9  b. 4 × 9  c. 2 × 8
2a. 1 × 8  b. 8 × 9  c. 7 × 9
3a. 5 × 9  b. 7 × 8  c. 5 × 8
4a. 8  b. 9  c. 8
Find the quotient.
5a. 9 ÷ 9  b. 72 ÷ 8  c. 81 ÷ 9
6a. 64 ÷ 8  b. 27 ÷ 9  c. 40 ÷ 8
7a. 36 ÷ 9  b. 0 ÷ 8  c. 72 ÷ 9
8a. 8)48  b. 8)24  c. 9)54
9a. 8)56  b. 9)45  c. 8)16
Write the rule. Then complete the pattern.
10a. 2, 4, 8, ?  b. 24, 6, 8, 2, 4, ?

Write the complete fact family for each.
10a. 4, 7, 28  b. 5, 6, 30
11a. 4, 8, 32  b. 6, 9, 54

Multiply.
12a. 3 × 2 × 4  b. 2 × 1 × 5

Problem Solving
13. Jo puts 42 books in 6 boxes. There are the same number of books in each box. How many books are in each box?
14. Louis worked 7 days a week for 8 weeks. How many days did he work?
15. Seven friends share 35 pencils equally. How many pencils does each friend get?
16. Sarah bought 8 packages of nails. There are 7 nails in each package. How many nails did Sarah buy?
CHAPTER 7

Practice 7-1

The tally chart shows the number of absences in each grade last month.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>H</td>
</tr>
<tr>
<td>2</td>
<td>H H H</td>
</tr>
<tr>
<td>3</td>
<td>H H H H</td>
</tr>
<tr>
<td>4</td>
<td>H H H</td>
</tr>
</tbody>
</table>

1. Use the chart to make a bar graph. Use a scale of 2.
2. What is the range of the data?
3. What is the mode of the data?

4. Frances has a pair of blue and a pair of black jeans. She has a blue, a yellow, and a white sweater. How many different outfits can she make?

Make a tree diagram and a list.

5. of landing on red.
6. of landing on blue.
7. of landing on yellow.
8. Is it certain or impossible that the spinner will land on green?
9. Which color is the spinner more likely to land on than any other color?

Practice 7-2

1. Find the median and the mean for the data on this line plot.

Use the circle graph for exercises 2 and 3.

2. Which color marble makes up one half of Joan’s marble collection?
3. Which color represents one fourth?

Use the line graph for exercises 4–6.

4. On which days did the club sell 2 kites?
5. What was the greatest number of kites sold? On which day was the greatest number sold?
6. Did sales increase or decrease between the second and third days?
7. What happened to sales between the fourth and fifth days?
8. On the sixth day, the club sells 2 more kites than they did on the fourth day. How many kites did they sell on the sixth day?
CHAPTER 8

Practice 8-1

Which unit is used to measure each: in., ft, yd, or mi?

1. length of a marker
2. height of a doorway
3. length of a soccer field

Compare. Write <, =, or >.

4a. 5 in. ? 5 yd  
   b. 8 ft ? 8 yd
5a. 1 ft ? 14 in.  
   b. 3 ft ? 3 mi

Use a ruler to measure each line segment to the nearest quarter inch.

6. __________________________

7. __________________________

Draw a line for each length.

8a. 2 in.  
   b. 3 \frac{1}{2} \text{ in.}  
   c. 1 \frac{3}{4} \text{ in.}

Which unit is used to measure each: c, pt, qt, or gal?

9. juice in a small glass
10. house paint in a large can

Which unit is used to measure each: oz or lb?

11. tape recorder
12. pencil

Compare. Write <, =, or >.

13a. 3 qt ? 1 gal  
    b. 20 oz ? 1 lb

Practice 8-2

Which unit is used to measure each: cm, dm, m, or km?

1. length of a pencil
2. length of a bridge
3. height of a television

Compare. Write <, =, or >.

4a. 200 m ? 200 cm  
   b. 3 dm ? 3 m
5a. 210 cm ? 2 m  
   b. 22 dm ? 2 m
6a. 1 km ? 1 dm  
   b. 1500 m ? 1 km

Use a centimeter ruler to measure each line segment to the nearest centimeter.

7. __________________________

8. __________________________

Which unit is used to measure each: mL or L?

10. milk in a spoon
11. oil in a large jug

Which unit is used to measure each: g or kg?

12a. baby  
    b. cookie

Compare. Write <, =, or >.

13a. 3 mL ? 3 L  
    b. 2000 g ? 2 kg

Problem Solving

14. Joan needs 80 decimeters of ribbon to trim costumes for the school play. The store sells ribbon by the meter. How many meters of ribbon should Joan buy?

15. Margaret makes a house 3 meters high as part of the set for the school play. Norm makes a house that is 20 decimeters high. Whose house is higher?
CHAPTER 9

Practice 9-1

Draw these figures on grid paper.

1a. scalene triangle   b. right triangle
2a. hexagon            b. rectangle
3a. isosceles triangle  b. pentagon
4a. octagon            b. trapezoid

Name each: line, line segment, ray, or none of these.

5a. [diagram]          b. [diagram]

7. Draw two lines that are parallel.
8. Draw two lines that are perpendicular.
9. Tell which figure is not a parallelogram: rectangle, rhombus, trapezoid, square.

10. Tell which figure is a quadrilateral: hexagon, rhombus, pentagon, octagon.

Find two congruent figures.
11a. [diagram] b. [diagram] c. [diagram] d. [diagram]

Find two similar figures.
13a. [diagram] b. [diagram] c. [diagram] d. [diagram]

15. Name a figure that has 4 sides of the same length and 4 right angles.
17. Draw an obtuse angle.
Practice 9-2

1. Write the ordered pair for D.
2. Write the letter for (0, 3).

Is each a line of symmetry? Write Yes or No.
3a. A
   b. N
   c. Q

Write translation, reflection, or rotation for each.
4a. ▲ ▲
   b. ▲ ▲

Write the name of each solid figure.
5a. 
   b. 

Find the perimeter.
6a. 2 in. 2 in.
   b. 4 cm △ 4 cm

Find the area in square units.
7a.
   b. 

Find the volume.
8a.
   b. 

CHAPTER 10

Practice 10-1

Estimate. First round, then use front-end estimation.

1a.  43
    ×  2
    ————
    86

1b.  26
    ×  4
    ————
    104

1c.  $32
    ×  3
    ————
    $96

2a.  69
    ×  3
    ————
    207

2b.  52
    ×  4
    ————
    208

2c.  $45
    ×  7
    ————
    $315

3a.  86
    ×  9
    ————
    774

3b.  34
    ×  4
    ————
    136

3c.  $29
    ×  8
    ————
    $232

Find the product.
4a.  3 × 12
    ————
    36

4b.  2 × 21
    ————
    42

4c.  4 × $22
    ————
    $88

5a.  4 × 17
    ————
    68

5b.  2 × 28
    ————
    56

5c.  3 × $38
    ————
    $114

Problem Solving

6. Mario has 4 packs of pencils. Each pack contains 20 pencils. How many pencils does Mario have?

7. A box contains 38 books. Each box has the same number of books. How many books are in 7 boxes?

8. If 9 students each read 21 books, how many books do they read altogether?


10. A tour leader speaks to 16 people in each of his 3 morning tours. Then he speaks to 18 people in each of his 4 afternoon tours. How many people does the tour leader speak to that day?
Practice 10-2

Estimate. Then multiply.

1a. \[\times 3\]  
   \[\times 2\]  
   \[\times 2\]  

2a. \[\times 7\]  
   \[\times 2\]  
   \[\times 6\]  

3a. \[\times 2\]  
   \[\times 3\]  
   \[\times 4\]  

4a. \[\times 5\]  
   \[\times 4\]  
   \[\times 2\]

Problem Solving

5. A tape recorder costs $125. Estimate the cost of 2 recorders.

6. Barbara saves $2145 a year. How much does she save in 3 years?

7. There are 250 sheets of computer paper in each package. Kippy has 4 packages of paper. How many sheets of computer paper does he have?

8. Jon has 4 bags of balloons. Each bag holds 125 balloons. How many balloons does he have?

CHAPTER II

Practice 11-1

Complete.

1. \[11 ÷ 3 = \, ? \text{ remainder } ?\]

2. \[19 ÷ 2 = \, ? \text{ remainder } ?\]

3. \[27 ÷ 3 = \, ? \text{ remainder } ?\]

4. \[33 ÷ 5 = \, ? \text{ remainder } ?\]

Find the quotient and the remainder.

5a. \(4 ÷ 26\)  
   \(5 ÷ 20\)  
   \(6 ÷ 33\)

6a. \(7 ÷ 22\)  
   \(8 ÷ 65\)  
   \(9 ÷ 31\)

7a. \(5 ÷ 28\)  
   \(3 ÷ 14\)  
   \(8 ÷ 35\)

Divide and check.

8a. \(42 ÷ 5\)  
   \(35 ÷ 8\)

9a. \(26 ÷ 9\)  
   \(34 ÷ 7\)

10a. \(51 ÷ 6\)  
   \(22 ÷ 4\)

Find the quotient.

11a. \(3 ÷ 90\)  
   \(3 ÷ 900\)  
   \(4 ÷ 80\)

12a. \(4 ÷ 800\)  
   \(2 ÷ 60\)  
   \(6 ÷ 600\)

Problem Solving

13. Sally has 29 stickers to share equally among 4 people. How many stickers will each person get? How many stickers will be left over?

14. Five shirts will fill each box. Tony has 24 shirts to pack. At most, how many boxes will he fill? How many shirts will be left over?

15. Louise has 14 postcards. She wants to send the same number of postcards to each of 6 people. How many postcards will each person get?

16. How many 6s are in 34? What is the remainder?

17. Len has 44 seashells to put into bags with 8 seashells in each. How many bags of 8 will he fill?

18. How many groups of 5 pipe cleaners can be made from a total of 27 pipe cleaners? How many will be left over?

19. How many groups of 7 color markers can be made from a total of 38 markers? How many will be left over?
Practice 11-2
Divide and check.
1a. 47 \div 2  b. 56 \div 5  c. 99 \div 9
2a. 89 \div 2  b. 78 \div 9  c. 57 \div 7
3a. 45 \div 3  b. 68 \div 8  c. 99 \div 5
4a. 77 \div 9  b. 89 \div 5  c. 56 \div 3

Estimate the quotient.
5a. 33 \div 1  b. 52 \div 8  c. 65 \div 8
6a. 5 \div 5.10  b. 3 \div 6.14  c. 4 \div 16.21

CHAPTER 12
Practice 12-1
Write the fraction for the shaded part.
1a.  
2a.  
3a.  

Write the equivalent fraction.
4a.  

Compare. Write <, =, or >.
5a.  

Estimate the fraction for the part of the set that is shaded. Write less than \( \frac{1}{2} \) or more than \( \frac{1}{2} \).
6a.  

Find part of the number or amount.
6a. \( \frac{1}{2} \) of 18 = ?  b. \( \frac{1}{4} \) of 16¢ = ?

Problem Solving
7. Estimate the cost of each pencil if 5 pencils cost $1.09.
8. Alex separates 105 books into 5 equal piles. How many books are there in each pile?
9. Two friends share 17 marbles equally. How many marbles does each get? How many marbles are left over?

Write the mixed number.
7a.  

Use fraction strips to model each. Then find the sum or difference.
8a. \( \frac{1}{6} + \frac{4}{6} = ? \)  b. \( \frac{3}{8} + \frac{4}{8} = ? \)
9a. \( \frac{2}{5} + \frac{2}{5} = ? \)  b. \( \frac{1}{3} + \frac{1}{3} = ? \)
10a. \( \frac{7}{8} - \frac{3}{8} = ? \)  b. \( \frac{3}{4} - \frac{1}{4} = ? \)
11a. \( \frac{9}{10} - \frac{3}{10} = ? \)  b. \( \frac{5}{7} - \frac{2}{7} = ? \)

Write in order from greatest to least.
12a.  

Write in order from least to greatest.
13a.  

Problem Solving
14. Of 18 bikes, \( \frac{1}{3} \) have a racing stripe. How many have a racing stripe?
15. A package of 8 color markers costs 96¢. What is the unit cost per marker?
CHAPTER 13

Practice 13-1

Write the decimal.

1a. \( \frac{3}{10} \)  
   b. \( \frac{5}{10} \)  
   c. \( \frac{2}{10} \)

2a. four tenths  
   b. eight tenths

3a. \( \frac{2}{10} \)  
   b. \( \frac{1}{10} \)  
   c. \( \frac{7}{10} \)

4. two and nine tenths

5a. \( \frac{23}{100} \)  
   b. \( \frac{41}{100} \)  
   c. \( \frac{6}{100} \)

6. thirty-nine hundredths

Write the word name for each.

7a. \( \frac{7}{10} \)  
   b. 0.8  
   c. 0.1

8a. \( \frac{4}{100} \)  
   b. 0.05  
   c. 8.2

9a. \( \frac{9}{10} \)  
   b. \( \frac{32}{100} \)  
   c. 8.43

Compare. Write <, =, or >.

10a. 0.9 ? 0.6  
    b. \( \frac{3}{10} \) ? 0.4

Order from least to greatest.

11a. 0.6, 0.9, 0.2  
    b. 0.7, 0.1, 0.4

12a. 1.9, 1.3, 1.5  
    b. 7.6, 7.8, 7.5

Find the sum.

13a. \( 0.3 + 0.4 \)  
    b. \( 0.36 + 0.22 \)  
    c. \( 6.84 + 2.05 \)

14a. \( 8.95 + 4.33 \)  
    b. \( 6.32 + 9.84 \)  
    c. \( 52.95 + 13.45 \)

Find the difference.

15a. \( 0.8 - 0.3 \)  
    b. \( 0.75 - 0.42 \)  
    c. \( 9.66 - 3.04 \)

16a. \( 2.04 - 1.05 \)  
    b. \( 8.23 - 4.75 \)  
    c. \( 73.00 - 51.42 \)

Compute.

17a. \( \$4.36 \times 4 \)  
    b. \( \$7.06 \times 5 \)

18a. \( 3 \times \$6.39 \)  
    b. \( 4 \times \$8.36 \)

CHAPTER 14

Practice 14-1

Is the number divisible by 5?

1a. 30  
   b. 48  
   c. 65  
   d. 86

Is the number divisible by 10?

2a. 25  
   b. 30  
   c. 50  
   d. 90

Write an expression for the words.

Use \( n \) as a variable for unknown numbers.

3a. 15 more than 68  
    b. 42 less than a number

4. a number multiplied by 5

5. 37 added to a number

Simplify.

6a. \( 16 - 3 \times 4 \)  
    b. \( 6 - 2 \times 2 \)

7a. \( 12 \div 2 \times 3 \)  
    b. \( 15 \div 3 \times 5 \)

Write +, −, ×, or ÷ to complete.

8a. \( 9 \bigcirc 9 = 81 \)  
    b. \( 9 \bigcirc 3 = 3 \)

9a. \( 5 \bigcirc 4 = 9 \)  
    b. \( 18 \bigcirc 9 = 9 \)

List all the common factors.

10a. 4 and 12  
    b. 5 and 13

Find two ways to make the sides equal.

11. \( 282 - 250 = 8 \bigcirc n \)
SET 1
Compute.
1a. $7 + \_ = 15$  
1b. $13 = 6 + \_$
2. $10 - \_ = 9$  
3. $6 = 12 - \_$
4. $8c + \_ = 10c$  
5. $9c - \_ = 7c$

Compare. Write $<$, $=$, or $>$.
6. $9 - 3\_8 - 2$
7. $5 + 3\_9 - 2$
8. $5\text{ thousand } 2\_5007$
9. $3\text{ half-dollars, } 2\text{ nickels } \_ \$1.70$
10. $4\text{ quarters, } 5\text{ dimes } \_ \$1.50$
11. How many odd numbers are between 163 and 175?

SET 2
Compute.
1a. $300 + 40 + 8$  
1b. $4000 + 50 + 2$
2. $127 - 30$  
3. $2000 - 90$
4. $19.55 + .45$  
5. $10.00 - 1.75$

Compare. Write $<$, $=$, or $>$.
6. $153 + 50 \_ 450 - 200$
7. $17,378 \_ 17,830$
8. $7\text{ dimes } \_ 14\text{ nickels}$
9. $3\text{ half-dollars } \_ 7\text{ dimes}$

Order from greatest to least.
10. 265, 2650, 2615, 26
11. 101, 11, 110, 1101

SET 3
Compute.
1. $5\text{ tens } + 13\text{ ones}$
2. $265 + 374$
3. $24\text{ hundreds } = \_ \text{ thousands } \_ \text{ hundreds}$
4. $6425 + 1796$
5. $2\text{ quarters, } 1\text{ dime, } 3\text{ nickels}$

Compare. Write $<$, $=$, or $>$.
6. $4 \times 2\_3 \times 4$
7. $2 \times 9\_4 \times 4$
8. $1\text{ dollar, } 1\text{ quarter } \_ 6\text{ quarters}$
9. Round $8.32$ to the nearest dollar.
10. Round $2.38$ to the nearest dime.

12. Beth bought 17 muffins and Amy bought 8 muffins. How many more muffins does Amy need to have as many as Beth?
13. Gil had 5 stamps from Brazil and double that number from Chile. How many stamps did he have in all?
14. Leo’s plant is taller than Alan’s. Leo’s plant is shorter than Ryan’s. Who has the shortest plant?
15. Carly had 20 pennies. With each step she took, she dropped 3 pennies. She has 8 pennies left. How many steps did she take?

12. John added 29 + 36 on his calculator. When 100 came up on the display, he knew he forgot to clear the calculator. What was the original amount on the calculator?
13. Fill in the missing addend.
$32 + 19 + \_ = 116$
14. Lucia gave 32 stickers to a friend. Then she had 14 stickers left. How many stickers did she have in the beginning?
15. A book and a pen cost $2.00 in all. The book cost $1.40 more than the pen. What did the pen cost?

11. Nan has 12 children behind her and 11 girls and 13 boys ahead of her. What place is Nan in line?
12. Akemi has 67 marbles in one bag and 42 in another. Round the numbers to tell about how many marbles he has in all.
13. Lucio gave 10 stickers to a friend. He had 14 left. How many did he have at first?
14. Make this statement true.
$24 = \_ = 16 + \_$
15. Of 1245 tickets, 956, 175, and 36 were sold on 3 days. How many tickets are left?
SET 4

Compute.
1. $75 - 56$  
2. $723 - 259$
3. $8 \times 2 + 3$  
4. $2 + 4 \times 4$
5. $\$7.00 - \$2.34$  
6. $\$8.37 - \$3.99$

Compare. Write $<$, $=$, or $>$.
7. $5934 + 325 \ ? \ 352 + 5903$
8. $1875 - 250 \ ? \ 1485 + 165$

Estimate. Round to the nearest thousand.
9. $6251 + 2798$  
10. $9329 - 6980$

11. How many groups of 5 can you make with 35 pennies? 50 pennies?

12. Tom's pencil case holds 7 pencils. Julie's case holds twice as many. How many pencils can they hold in all?

13. After bagging 18 rolls, Mac counted 14 left. How many were there at first?

14. Lan stacks 7 rows of cans in a pattern for a store display. She puts 31 cans on the bottom row, 27 on the next row, and 23 on the next. How many cans will be on the top row?

15. Shannon has $75c$ in nickels and dimes. If there are 10 coins, how many of each coin does she have?

SET 5

Compute.
1. $3 \times \ ? \ = \ 15$  
2. $4 \times 7 = \ ?$
3. $\ ? \div 3 - 5$  
4. $28 \div \ ? \ = \ 7$
5. $27 \div 3 \ - \ ?$  
6. $30 \div 5 \ - \ ?$
7. $3(2 \div 8) + (6 \times 5) = \ ?$
8. $3 \times 4 \times 2 = \ ?$
9. $7.20 \times 4 = \ ?$

Use $+$, $-$, $\times$, or $\div$ to make the sentence true.
8. $9 \ ? \ 4 = 40 \ ? \ 8$  
9. $56 \ ? \ 8 = 6 \ ? \ 1$

Compare. Write $<$, $=$, or $>$.
10. $6 \times 9 \ ? \ 8 \times 7$  
11. $72 \div 9 \ ? \ 25 - 16$

12. Ernie wants to buy a train set for $18.95 and a model car for $7.89. Is $28.00 enough?

13. On Monday the grass is 2 cm high. By Tuesday the grass is 4 cm high. Each day the grass doubles its height from the day before. How high will the grass be on Friday?

14. Mary bought 5 packages of hair bows, each containing 1 dozen bows. If she gave away 15 bows, how many bows does she have left?

15. Rick and Spot are pet dogs. Rick is 3 years old and Spot is 12. How old will each dog be when Spot is twice as old as Rick?

SET 6

Use your ruler to draw a line for each length.
1. $7 \ \frac{1}{2} \ \text{in.}$  
2. $4 \ \frac{1}{2} \ \text{in.}$  
3. $8 \ \frac{3}{4} \ \text{in.}$

Compare. Write $<$, $=$, or $>$.
4. $3 \ \text{pt} \ ? \ 2 \ \text{qt}$  
5. $2 \ \text{gal} \ ? \ 6 \ \text{qt}$
6. $12 \ \text{oz} \ ? \ 1 \ \text{lb}$  
7. $2 \ \text{m} \ ? \ 1 \ \text{km}$

Compute.
8. $10 \ \text{kl} = \ ? \ \text{L}$  
9. $20 \ \text{kg} = \ ? \ \text{g}$  
10. $40 \ \text{km} = \ ? \ \text{cm}$

11. How many ways can Jessie, Than, Jake and Katie stand in line?

12. Would you use a pictograph or a bar graph to compare the heights of 6 people?

Use the graph to answer the questions.

<table>
<thead>
<tr>
<th>Favorite Flower</th>
<th>tally mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet</td>
<td>✈️✈️✈️✈️✈️</td>
</tr>
<tr>
<td>Tulip</td>
<td>✈️✈️✈️✈️✈️</td>
</tr>
<tr>
<td>Rose</td>
<td>✈️✈️✈️✈️✈️</td>
</tr>
<tr>
<td>Daisy</td>
<td>✈️✈️✈️✈️</td>
</tr>
</tbody>
</table>

Key: Each ✈️ = 4 children.

13. How many children like roses?

14. How many more children like violets than like daisies?

15. How many children have named their favorite flowers?
SET 7

Compute.
1. \(6 \times 7 = ?\)  
2. \(8 \times 6 = ?\)  
3. \(9 \div 1 - 3 \times 2\)  
4. \(8 \div 8 + 6 \times 6\)  

Compare. Write <, =, or >.
5. \(3 \times 1 \times 6 \quad ? \quad 2 \times 3 \times 7\)  
6. \(2 \times 4 \times 4 \quad ? \quad 4 \times 1 \times 4\)  

Estimate. Round to the nearest hundred.
7. \(6532 + 3793\)  
8. \(9291 - 8583\)  

Choose the better answer.
9. The length of a nail: 4 cm or 4 m?  
10. A lump of sugar: 1 kg or 1 g?

SET 8

Compute.
1. \(\$0.72 \div 9 = ?\)  
2. \(\$5.60 \div 7 = ?\)  
3. \(2 \times 10 \times 3 = ?\)  
4. \(10 \times 6 - 5 = ?\)  
5. \(623 + 284 = ?\)  
6. \(723 - 259 = ?\)  

Complete.
7. \(8 \times 5 - 40\) is to \(40 \div 5 - 8\)  
as \(7 \times 4 = 28\) is to ?  
8. \(7 + 9 = 16\) is to \(16 - 7 = 9\)  
as \(8 + 5 = 13\) is to ?  

Give the total money value.
9. 3 quarters, 5 dimes, 3 nickels  
10. 9 quarters, 8 dimes, 2 nickels, 4 pennies

SET 9

1. Make a line segment 4 cm long.
2. Which is a ray?  
3. Which is a polygon?  
4. Which is a right angle?  
5. Which shapes are congruent?
   a.  
   b.  
   c.  
   d.  
6. Which shapes are similar?
   a.  
   b.  
   c.  
   d.  
7. Is each a line of symmetry?
8. Is the figure a translation, reflection, or rotation?
9.  
10.  

Challenege

11. Friday at 9 A.M. the thermometer read 63°F.  
   Saturday at 9 A.M. the temperature reads \(8^\circ\) higher. What is Saturday’s temperature?
12. At what Celsius temperature could you go ice-skating?
13. It is 150 m to Louisa’s house. If Sally has already gone 80 m, how much further does she have to go?
14. It takes Mr. Perez 2 hours to drive to the beach. If he leaves his home at 10:15 A.M., at what time will he reach the beach?
15. If today is Monday, January 1st, what day of the week will it be on January 22nd?
**SET 10**

Estimate by rounding.
1. \(4 \times 26\)  
2. \(8 \times 263\)  
3. \(9 \times 175\)  

Compute.
4. \(5 \times 716\)  
5. \(6 \times 324\)  
6. \(5 \times 209\)  
7. \(9 \times 8.32\)  
8. \(6 \times 3.59\)  

Compare. Write <, =, or >.
9. \(24 \div 6\)  
10. \(9 \div 8\)  
11. \(4\)  
12. \(7\)  
13. \(4\)  
14. \(7\)  

11. Pete has $23.87. About how many baseball cards can he buy if the cards sell 4 for $2.00?

**SET II**

Compute.
1. \(\frac{5}{8} = \frac{?}{40}\)  
2. \(\frac{3}{5} = \frac{?}{25}\)  
3. \(\frac{8}{9} = \frac{?}{27}\)  

Compare. Write <, =, or >.
4. \(\frac{2}{3}\)  
5. \(\frac{1}{3}\)  

6. \(\frac{5}{8} + \frac{1}{3} = \frac{?}{?}\)  
7. \(\frac{7}{9} - \frac{2}{3} = \frac{?}{?}\)  
8. \(\frac{1}{4}\) of 40  
9. \(\frac{1}{5}\) of 27  
10. \(\frac{1}{6}\) of 18

Write the mixed number.
10. \(\frac{5}{4}\)

**SET 12**

Change each to a decimal.
1. \(\frac{7}{10}, \frac{8}{10}, \frac{3}{10}, \frac{4}{10}, \frac{8}{10}, \frac{9}{10}\)  
2. \(\frac{1}{100}, \frac{34}{100}, \frac{52}{100}, \frac{92}{100}, \frac{73}{100}\)  

Compare. Write <, =, or >.
3. \(0.05 + 0.35 = \frac{?}{0.04} + 0.42\)  
4. \(0.56 + 0.1 = \frac{0.51 + 0.3}{0.72} - 0.49\)  
5. \(0.32 - 0.01 = \frac{0.23}{0.10}\)  

7. If \(5 + n > 12\), write all of the numbers that \(n\) could be: 9, 6, 7, 4, 8  
8. If \(7 + n < 15\), write all of the numbers that \(n\) could be: 9, 6, 7, 8, 5  
9. \(5\)  
10. \(8\)  

11. Jim ran 8.2 miles. Darcy ran 6.9 miles. Write a number sentence to tell how much longer Jim’s run was than Darcy’s.  
12. Choose the numbers that are divisible by 2, 5, and 10: 8, 30, 15, 50, 10, 36.  
13. Thuy baked 3 batches of 12 cookies each. Nina baked 4 batches of 11 cookies each. Ken baked 96 cookies in all. How many more cookies did Ken bake than Thuy and Nina together?  
14. Use +, −, ×, or ÷ to make this sentence true. 20 \(\frac{?}{5} = 240 \frac{?}{60}\)  
15. The third grade students wanted to raise $75.00. On Saturday they made $48.75 and on Sunday, $40.32. Did they reach their goal? How much more or less did they make?
Listen to your teacher read the directions. You do not need paper and pencil.

**SET 1**

1. \(9 + 1; 7 + 2; 5 + 3; 8 + 0\)
2. \(9 - 2; 8 - 3; 10 - 4; 7 - 5; 6 - 4\)
3. Add 3 to: 4, 14, 24, 34, 44, 54, 64, 74, 84, 94
4. Subtract 2 from: 7, 17, 27, 37, 47, 57, 67, 77, 87, 97
5. Double: 2, 4, 6, 8, 1, 3, 5
6. \(\_\) nickels = 1 dime

**SET 2**

1. \(12 - 5; 11 - 6; 13 - 6; 17 - 9; 15 - 8\)
2. \(8 + 4; 9 + 3; 8 + 5; 7 + 6; 9 + 5\)
3. Add 5 to: 12, 22, 32, 42, 52, 62, 72, 82, 92, 102
4. Subtract 6 from: 7, 17, 27, 37, 47, 57, 67, 77, 87, 97
5. Give 4 facts: 12, 5, 7; 16, 9, 7; 13, 4, 9; 17, 8, 9; 15, 8, 7; 14, 6, 8
6. Ami collected 13 dolls. Sue has 8. How many more dolls does Ami have?

**SET 3**

1. Even or odd? 7, 34, 16, 51, 67, 58
2. Order: 45, 450, 145; 118, 89, 189; 676, 760, 67; 330, 303, 333; 191, 19, 119
3. \(\_\) tens \(\_\) ones: 82, 6, 35, 97
4. Find the sums for 14: \(5 + \_\); \(6 + \_\); \(7 + \_\); \(8 + \_\); \(9 + \_\); \(10 + \_\); \(11 + \_\); \(12 + \_\)
5. Add 2 to: \(3 + 1; 4 + 2; 5 + 3; 2 + 7; 1 + 4; 3 + 2; 5 + 4; 6 + 2; 7 + 3\)

7. Brad had 12 cows. He sold 5 of them. How many are left?
8. April has 4 shells and Babs has 3 shells. How many shells do they have in all?
9. A box holds 9 plums and 2 pears. Another holds 2 plums and 9 pears. How much fruit is in each box?
10. What number added to 7 is 14?

7. Lyn has 8 white and 7 red roses. How many roses does she have in all?
8. \(\_\) pennies = 1 quarter
9. Todd needs 12 pieces of wood. He has 9 pieces. How many more pieces does he need?
10. Carlos has 6 pencils. Leo has double the number of pencils. How many pencils does Leo have?

6. Complete the pattern: 5, 105, 205, 305, \(\_\), \(\_\), \(\_\)
7. Teresita is 3 years old. Dad is 30 years older. How old is Dad?
8. Carly is twelfth in line. How many children are in front of her?
9. Ann has 1 red, 4 white, and 5 blue cars. How many cars does she have in all?
10. Which number is larger: 500 + 60 + 1 or 500 + 10 + 6?
SET 4

1. 6 + 8; 7 + 7; 9 + 5; 5 + 9; 6 + 9; 6 + 7; 8 + 6; 2 + 5; 7 + 6; 7 + 8
2. Count by 2s, by 5s, and by 10s:
   10 to 40; 30 to 70; 110 to 140; 270 to 300; 475 to 600
3. Give the value: 25, 17, 91, 106, 234, 165, 290, 6
4. Round: 18, 24, 47, 62, 28, 83, 32, 45, 69, 51, 11, 74, 97
5. How many tens in: 14, 54, 72, 103, 37, 116, 81, 125, 200?

6. Kyle has 2 quarters, 1 dime, and 3 nickels. How much does he have?
7. Ann bought one item for 9¢ and one item for 5¢. How much did she spend?
8. Popcorn costs 99¢. If Tim has 9 dimes, can he buy the popcorn?
9. Give the standard form:
   7000 + 600 + 30 + 2
10. A ball costs 25¢. I pay with $1.00. How much change will I get?

SET 5

1. Add 6¢ to: 22¢, 32¢, 42¢, 52¢, 62¢, 72¢, 82¢
2. Subtract 5¢ from: 21¢, 31¢, 41¢, 51¢, 61¢, 71¢, 81¢, 91¢
3. Count by 100s from: 230 to 930, 102 to 902, 16 to 1016
4. ? tens ? ones: 16 ones; 12 ones; 2 tens 17 ones; 3 tens 11 ones; 18 ones

6. Dot sold lemonade for 10¢ a glass. How much did she make if she sold 6 glasses?
7. How many quarters are in $3.00?
8. John has 63 white buttons and 26 colored ones. About how many buttons does he have?
9. Trudy has 8 tomatoes. Beth has 4. How many fewer tomatoes does Beth have than Trudy?
10. Write the standard numeral for:
    twenty-four thousand, four hundred.

SET 6

1. Estimate by rounding: 36 + 43; 68 + 14; 17 + 12; 28 + 33; 56 + 49
2. ? hundreds ? tens: 15 tens; 13 tens; 3 hundreds 12 tens; 20 tens; 5 hundreds 14 ones; 16 tens
3. Add 8 to: 18, 28, 38, 48, 58, 68, 78, 88, 98
4. Add: 4 + 5 + 5; 7 + 3 + 7; 5 + 6 + 4; 3 + 8 + 2; 2 + 9 + 1
5. Round to the nearest dollar: $1.23, $4.68, $1.87, $2.49, $3.41

6. $1.87 = ? dimes, ? pennies
7. Jan has 16 green, 24 blue, and 12 red marbles. How many marbles does she have in all?
8. About how many dollars:
   $1.58 + $3.24?
9. Mother baked 14 butter cookies and 16 spice cookies. How many did she bake in all?
10. Kim collected 389 pennies. Can she buy a toy that costs $3.09?
**SET 7**

1. \(8 + 6; \ 7 + 6; \ 9 + 3; \ 6 + 4; \ \)  
   \(14 - 8; \ 13 - 7; \ 12 - 9; \ 10 - 6\)
2. Add 5 to: 15, 25, 45, 75, 95, 55, 85, 5, 35, 65
4. \(\_\) hundreds \(\_\) tens: 21 tens; 18 tens; 4 hundreds 2 tens; 7 hundreds 3 tens; 25 tens
5. Add: \(8 + 1 + 2; \ 3 + 6 + 7; \ 5 + 5 + 5; \ 6 + 1 + 4; \ 7 + 7 + 3; \ 9 + 7 + 1\)

**SET 8**

1. Subtract 2 from: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
2. Estimate by rounding: \(26 - 13; \ 46 - 17; \ 55 - 21; \ 61 - 37; \ 78 - 49; \ 33 - 11\)
3. Regroup 1 ten to ones: 4 tens 5 ones; 1 ten 6 ones; 2 tens 8 ones
4. \(17 - 6; \ 12 - 9; \ 15 - 6; \ 13 - 9; \ 15 - 6; \ 11 - 8; \ 14 - 8; \ 16 - 9\)
5. Round to the nearest dollar: \$1.85, \$2.10, \$3.45, \$4.76, \$5.99

**SET 9**

1. Estimate by rounding: \(180 - 120; \ 560 - 240; \ 450 - 130; \ 490 - 380; \ 320 - 310\)
2. Which is greater: \$45.00 or \$4500; \$3.90 or \$390; \$270 or \$27.00; \$5.40 or \$54.00; \$6200 or \$6.20?
4. Subtract 6 from: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
5. Regroup 1 thousand to hundreds: 2 thousands 3 hundreds; 6 thousands 4 hundreds; 8 thousands 1 hundred

**SET 10**

1. To 19 books Tim added 21 more. How many books are there?
2. The number before 221 is \(?\).
3. We saw 12 crows and 8 robins. How many birds did we see?
4. On Monday 3300 tickets were sold and on Tuesday 6200. How many tickets were sold in all?
5. The library has 135 books on sports, 430 on history, and 210 on science. How many books are in the library?

6. Subtract 2 from: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
7. Subtract 6 from: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
8. Which is greater: \$45.00 or \$4500; \$3.90 or \$390; \$270 or \$27.00; \$5.40 or \$54.00; \$6200 or \$6.20?
9. 2 thousands 3 hundreds; 6 thousands 4 hundreds; 8 thousands 1 hundred
SET 10

1. Solve: 4 twos, 5 threes, 3 twos, 2 fives, 2 sixes
2. Multiply by 1 and by 0: 3, 5, 2, 1, 6, 8, 0, 7, 9
3. Double these numbers: 2, 4, 6, 8, 1, 3, 5, 7, 9
4. Multiply by 2, by 3, and by 4: 9, 2, 4, 6, 8, 5, 0, 3
5. Give the time a half hour later than: 11:00, 4:00, 2:30, 10:30, 12:15, 1:15, 3:45, 4:45

6. One cookie costs 8 cents. How much do 2 cookies cost?
7. Ron walks 3 mi a day. How many miles does he walk in 8 days?
8. Dot has 4 apples. Her brother has 3 times as many. How many apples does he have?
9. The product is 24. One factor is 4. What is the other factor?
10. Roy has 9 tickets. If Matilda gives him 7 more, how many tickets will he have in all?

SET 11

1. Multiply by 4: 2, 3, 5, 1, 7, 8, 0, 9, 6, 4
2. Multiply by 3, by 4, and by 5: 0¢, 2¢, 4¢, 6¢, 8¢, 10¢, 9¢, 5¢, 7¢, 3¢
3. Use +, −, or ×: 8 2 = 10; 4 ? 2 = 8; 11 ? 3 = 8; 3 ? 2 = 6; 4 ? 9 = 13
4. Add 7 to: 2, 12, 22, 42, 52, 72, 32, 62, 82, 92
5. 9 × ? = 27; 4 × ? = 16; ? × 4 = 32; ? × 5 = 45; 7 × ? = 14; 6 × ? = 18

6. Mom spent $5. Dad spent 3 times that much. How much did Dad spend?
7. There were 17 pencils. Sam took 8 of them. How many were left?
8. If 5 students are sitting in each of 8 rows, how many students are there in all?
9. The product is 0. One factor is 4. What is the other factor?
10. The product is 9. One factor is 9. What is the other factor?

SET 12

1. Multiply by 2: 2, 4, 8, 1, 3, 5
2. Subtract 4 from: 28, 24, 20, 16, 12, 8, 4
3. Divide by 1 and by the number itself: 3, 6, 8, 4, 5, 2, 1, 9, 7
4. Divide by 2: 4, 8, 14, 16, 2, 10, 18, 6, 12
5. Divide by 3: 18, 12, 3, 9, 21, 27, 15, 6, 24
6. If one factor is 6 and the other 4, what is the product?

7. One class has 5 rows with 2 children in each row. Another class has 2 rows with 5 children in each. How many children are in each class?
8. Eve has 2 pens. Ed has 4 times as many. How many does Ed have?
9. Three girls have 7¢ each. What is the total amount?
10. The product is 14. What are the factors?
SET 13
1. Divide by 4: 36, 16, 20, 4, 12, 24, 8, 28, 32
2. Divide by 5: 25, 5, 40, 35, 10, 45, 15, 20, 30
3. Subtract 3 from: 27, 24, 21, 18, 15, 12, 9, 6, 3
4. Multiply by 5 and by 4: 1, 3, 5, 7, 9, 2, 4, 6, 8, 10
5. Count by 2s and by 4s: 8 to 20; 12 to 28; 4 to 16; 16 to 36; 12 to 32
6. Pencils come 2 to a box. How many boxes are needed for 10 pencils?
7. Write the missing numbers: 4, __, 12, __, 20, 24, __, __, __, 36
8. Jo buys 5 balloons at 8¢ each. How much does Jo spend?
9. There are 5 children in each row. How many children are in 6 rows?
10. Rex had 32¢. He spent 4¢. How much did he have left?

SET 14
1. Multiply by 6, then add 1: 3, 6, 2, 9, 0, 1, 4, 7, 8
2. \[ \frac{3}{9}, \frac{2}{12}, \frac{4}{8}, \frac{5}{15} \]
3. Give the related fact: \( 8 \div 2 = 4; 28 \div 4 = 7; 14 \div 2 = 7; 9 \div 3 = 3 \)
4. Subtract 8 from: 11, 13, 15, 17, 12, 14, 16, 10, 18, 19
5. \[ 8 + 7, 4 + 7, 7 + 9, 5 + 6, 6 + 9, 8 + 6, 5 + 6, 9 + 8 \]
6. How many twos are there in 18?
7. A horse trainer has 17 black horses and 8 brown horses. How many horses does he have in all?
8. The dividend is 35. The divisor is 5. What is the quotient?
10. The quotient is 3. The divisor is 2. What is the dividend?

SET 15
1. Add 3 to: 8, 18, 28, 38, 48, 58, 68, 78, 88, 98
2. Divide by 5: 5, 15, 25, 35, 45, 10, 20, 30, 40, 50
3. \[ 21 \div 3, 16 \div 4, 2 \div 2, 4 \div 1 \]
4. Subtract 4 from: 11, 12, 13, 14, 10, 9, 8, 7, 6, 5
5. \[ 8 \div ?, 12 \div ?, 15 \div ?, 25 \div ?, 36 \div ? \]
6. How many ways can a bird, a mouse, and a cat sit on a fence?
7. Key: Each \( \frac{4}{2} = 2; \frac{2}{4} \frac{3}{4} \)
   How many people are there?
8. Each box = 5 points: \[ \Box \Box \Box \Box \Box \]
   How many points are there?
9. A jar is filled with 5 red marbles. What is the probability of choosing a yellow marble? a red marble?
10. Team tallies for each quarter are \( \mathbb{I}, \mathbb{I}, \mathbb{II}, \mathbb{II}, \mathbb{II}, \mathbb{II}, \mathbb{II} \). What is the total team score?
SET 16

1. Add 12 to: 12, 24, 36, 48, 60, 72, 84
2. Multiply by 2 and by 4: 3, 6, 9, 0, 4, 2, 5, 8, 1, 7
3. Multiply by 3, then add 2: 3, 6, 9, 1, 7, 4, 8, 5, 0, 2
4. Compare using <, =, >:
   - 4 qt ? 1 gal; 2 c ? 2 qt;
   - 3 pt ? 1 qt
5. Count by 100s: 0 to 800;
   - 200 to 900; 100 to 1000;
   - 150 to 750

6. How many points did Juan score?
7. How many fewer points did Joe score than Stan?
8. How many more points did Juan score than Joe?
9. If Joe scores 6 more points, how many points will he have?
10. To make 20, how many points does Juan need?

SET 17

1. Add 16 to: 32, 80, 64, 16, 48, 51
2. Which month is: third, first, 5th, seventh, 10th, twelfth?
3. \( \frac{?}{?} \times 8 = 64 \quad \frac{?}{?} \times 6 = 42 \)
   - \( \frac{?}{?} \times 5 = 20 \quad \frac{?}{?} \times 7 = 14 \)
   - \( \frac{?}{?} \times 9 = 36 \quad \frac{?}{?} \times 7 = 35 \)
4. \( \frac{4}{36} \quad \frac{4}{28} \quad \frac{4}{16} \quad \frac{4}{8} \)
   - \( \frac{4}{20} \quad \frac{4}{32} \quad \frac{4}{12} \quad \frac{4}{4} \)
5. Add 9 to: 9, 8, 7, 6, 5, 4, 3, 2, 1
6. 2 lb = ? oz
7. Choose the customary unit of measure for the length of: scissors, walls, pens, rugs.
8. Sally has 1 meter of ribbon. How many centimeters is that?
9. John bought a pound of tea. How many ounces of tea did he buy?
10. 24 students went to the zoo. The trip was 15 mi each way. How many miles did they travel?

SET 18

1. Divide by 3: 12, 18, 9, 6, 27, 21, 3
2. Multiply by 6 and by 7: 6, 4, 9, 1, 8, 2, 5, 7, 3
3. Add 7 to: 8, 18, 28, 38, 48, 58, 68, 78, 88, 98
4. \( 6 \quad 7 \quad 6 \quad 8 \quad 9 \)
   - \( 2 \quad 4 \quad 3 \quad 2 \quad 1 \)
   - \( +3 \quad +0 \quad +3 \quad +2 \quad +3 \)
5. Count by 1000s: 0 to 7000;
   - 1000 to 8000; 2000 to 9000;
   - 100 to 9100
6. Name the months with 31 days.
7. How long does it take the big hand of the clock to go from one number to the next?
8. How long does it take the small hand of the clock to go from one number to the next?
9. \( ? \) g = 1 kg
10. \( ? \) min = 1 h
SET 19

1. Multiply by 3 and by 6: 2, 4, 7, 8, 1, 3, 5, 6, 0, 9
2. Divide by 7: 21, 49, 28, 56, 35, 63, 14, 42, 7
3. $1 \times 8 = 8, 8 \div 1 = 8$
   $2 \times 8 = 16, 16 \div 2 = 8$
4. Multiply by 8 and by 9: 5, 3, 6, 7, 2, 1, 8, 4, 9
5. $6 \div 12 = 6, 6 \div 24 = 6, 6 \div 18 = 6, 6 \div 54 = 6$
   $6 \div 6 = 6, 6 \div 30 = 6, 6 \div 42 = 6, 6 \div 36 = 6$
6. There are 4 quarts in a gallon. How many quarts are in 5 gallons?

SET 20

1. Add 8 to: 8, 18, 28, 38, 48, 58, 68, 78, 88, 98
2. Subtract 9 from: 16, 26, 36, 46, 56, 66, 76, 86, 96, 106
3. $5 \times 8 = 40, 40 \div 5 = 8$
   $6 \times 8 = 48, 48 \div 6 = 8$
4. $7 \times 8 = 56, 56 \div 7 = 8$
   $8 \times 8 = 64, 64 \div 8 = 8$
5. $5 \times 9 = 45, 45 \times 9 = 405, 405 \div 9 = 45$
   $9 \times 5 = 45, 45 \times 6 = 270, 270 \div 5 = 54$

SET 21

1. Divide by 8: 64, 8, 24, 32, 48, 56, 40
2. Divide by 9: 18, 45, 63, 9, 54, 27, 81, 72, 36
3. $2 \times 4 \times 2 = 16, 16 \times 3 = 48, 48 \times 2 = 96$
   $3 \times 2 \times 1 = 6, 6 \times 3 = 18, 18 \times 3 = 54$
4. What is the time 2 h later? 12:00, 3:00, 11:00, 10:30, 1:30
5. Multiply by 5: $10c, 20c, 30c, 40c, 50c, 60c, 70c, 80c$
6. Write the Roman numeral for 46.
7. Jean has 20 pennies. Sal has 4 times as many. How much does Sal have?
8. Each girl made 7 cards. How many cards did 8 girls make?
9. Fill in the missing numbers: 8, 16, __, 32, __, __, 56, __, 72
10. Dana’s kitten is 35 days old. How many weeks is that?
SET 22
1. Multiply by 6, by 7, and by 8:
8, 6, 9, 0, 5, 3, 4, 2, 1
2. 6)30  6)36  6)42  6)48
   6)24  6)18  6)12  6)64
3. Add 10 to: 9, 19, 29, 39, 49, 59, 69, 79, 89, 99
4. Double: 10, 50, 40, 30, 20, 60, 90, 70, 80
5. Name each space figure:

SET 23
1. $3 \times 1 \times 5$ $6 \times 2 \times 0$ $2 \times 5 \times 2$
   $4 \times 2 \times 2$ $3 \times 0 \times 3$ $1 \times 7 \times 2$
2. Subtract 7 from: 12, 13, 14, 15, 16, 17, 18, 19
3. 5 5 6 6 7
   3 4 2 3 2
   +2 +1 +2 +1 +1
4. Divide by 8 then add 1: 8, 64, 40, 16, 72, 56, 32
5. Divide by 9: 36, 72, 63, 9, 18, 45, 27, 54

SET 24
1. Multiply by 2: 10, 20, 30, 40, 50, 60, 70
2. Estimate by rounding: $18 \times 2$; $24 \times 3$; $13 \times 4$; $28 \times 2$; $16 \times 5$
3. Multiply by 4 then add 1: 1, 0, 5, 3, 6, 8, 2, 7, 9, 4
4. Name the numerator and the denominator:
   $\frac{1}{3}$, $\frac{2}{5}$, $\frac{7}{8}$, $\frac{3}{7}$, $\frac{4}{10}$, $\frac{3}{4}$, $\frac{5}{6}$
5. How many cents: 3 nickels, 5 nickels, 2 nickels, 4 dimes, 7 dimes, 2 quarters?
6. Five ribbons are needed to make a banner. Each ribbon is 20 cm long. How many cm must be bought in all?
7. At school 18 children are playing baseball with 9 on a team. How many teams are there?
8. The product of 7 × 7 is ?.
9. How many nines are in 81?
10. ? minutes = one half hour

6. A picture frame is 8 in. by 10 in. What is its perimeter?
7. Don made a floor plan of his bedroom. How many square units does the floor cover?
8. Tasha is 4 years old. Dad is 9 times her age. How old is Dad?
9. Name two solid figures with 6 faces, 12 edges, and 8 vertices.
10. Can a line of symmetry be drawn through the letter L?
SET 25

1. Estimate by rounding: 12 × 2; 28 × 3; 11 × 5; 39 × 2; 23 × 4; 17 × 3
2. Subtract 1 from: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
3. 5 × 6 = 30
   7 × 6 = 42
   6 × 5 = 30
   6 × 7 = 42
4. Divide by 7: 49, 50, 7, 9, 63, 68, 14, 20, 42, 46
5. Multiply by 10 then add 3: 0, 3, 7, 5, 4, 9, 6, 2, 8, 1

6. To find the product, you ___.
7. How many right angles are in a square? a right triangle?
8. A recipe calls for 2 c of sugar. To double the recipe how much sugar would you use?
9. Frozen yogurt is 25¢ a scoop. How much will a triple scoop cost?
10. Andy drove 22 mi north and 33 mi west. How far did he go?

SET 26

1. Divide by 2 and name the remainder: 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
2. \( \frac{2}{7} \times 9 = 18 \)
   \( \frac{5}{7} \times 9 = 22.5 \)
3. Give other names for 1:
   \( \frac{2}{7}, \frac{5}{7}, \frac{6}{7}, \frac{4}{7}, \frac{3}{7}, \frac{4}{7}, \frac{10}{7} \)
5. Add 4 to: 5, 15, 35, 25, 45, 75, 55, 65, 85, 95
6. What is the Roman numeral for 50?
7. Name the months with 30 days.
8. XVII – ?
9. Ed packs 12 eggs in 1 carton. How many eggs will fill 3 cartons?
10. Last year Macavoy weighed 35 kg. This year he weighs 40 kg. How many kg did he gain?

SET 27

1. \( 12 \div 2 = 6 \)
   \( 15 \div 3 = 5 \)
   \( 25 \div 5 = 5 \)
   \( 16 \div 4 = 4 \)
   \( 18 \div 9 = 2 \)
   \( 36 \div 6 = 6 \)
   \( 28 \div 7 = 4 \)
   \( 81 \div 9 = 9 \)
   \( 40 \div 8 = 5 \)
2. Add 6 to: 7, 10, 8, 11, 21, 33, 9, 27, 44, 101
3. Divide by 3 and by 6: 6, 18, 24, 12, 30, 60
4. Divide by 3 and name the remainder: 16, 17, 19, 21, 22, 23, 25, 26
5. Divide by 5 and name the remainder: 12, 13, 14, 18, 19, 22, 23, 36
6. Six pencils fit in a case. If there are 27 pencils, how many cases can be completely filled? How many pencils are extra?
7. School is designated by the ordered pair (4, 3) on a graph. What does that mean?
8. There are 24 cashiers and 12 people helping to bag groceries. How many workers are there in all?
9. There are 5 horses with a shoe on each hoof. How many shoes are there?
10. Al wants to buy a $.39 horn. He has $.30. How much more does he need?
1. How many sides are in a triangle? a square? a rectangle?
2. Identify: 
   \[ \rightarrow \quad \rightarrow \quad \rightarrow \]
4. Estimate by rounding: $8.12 + 4$; $5.85 ÷ 3$; $2.24 ÷ 2$; $4.90 ÷ 5$
5. Give the related fact: $24 ÷ 4 = 6$; $15 ÷ 3 = 5$; $14 ÷ 7 = 2$; $24 ÷ 8 = 3$

6. Paul sold 20 chances for 5¢ each. How much money did he receive?
7. Our family drove 30 km a day. How many km did we drive in 5 days?
8. There are 54 peaches in 6 baskets. Each basket holds the same number. How many peaches are in one basket?
9. $9 \times 8$ is the same as $8 \times \_$. 
10. What is the remainder of $26 ÷ 7$?

SET 29

1. \[ \frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12} = \frac{5}{15} \]
2. Compare using <, =, or >: \[ \frac{2}{3} \; \frac{1}{2}, \frac{1}{4} \; \frac{3}{4}, \frac{1}{5} \; \frac{3}{5}, \frac{7}{8} \; \frac{6}{8}, \frac{5}{7} \; \frac{6}{7} \]
3. Divide by 4 and name the remainder: 9, 11, 15, 19, 23, 27, 31, 33
4. Multiply by 9: 4, 7, 2, 8, 1, 5, 9, 6, 3
5. \[ \frac{1}{2} - \frac{2}{4} - \frac{2}{6} - \frac{2}{8} - \frac{2}{10} \]

6. Flat figures with straight sides are called ___.
7. How many 9¢ treats can Dan buy with 36¢?
8. Ed has 9 rabbits. He puts a pair into each hutch. How many hutch does he fill?
9. Give the family of facts for: $30 ÷ 5 = 6$.
10. There are 66 books divided equally across 3 shelves. How many books are on each shelf?

SET 30

1. \[ \frac{1}{6} \] of 42 \[ \frac{1}{6} \] of 48 \[ \frac{1}{6} \] of 54
   \[ \frac{1}{6} \] of 24 \[ \frac{1}{6} \] of 30 \[ \frac{1}{6} \] of 36
2. \[ \frac{1}{6} + \frac{4}{6} = \frac{5}{6} \]
   \[ \frac{3}{10} + \frac{4}{10} = \frac{7}{10} \]
   \[ \frac{2}{5} + \frac{1}{5} = \frac{3}{5} \]
   \[ \frac{4}{7} + \frac{1}{4} = \frac{4}{7} \]
3. \[ \frac{1}{5} \] of 10 \[ \frac{1}{5} \] of 20 \[ \frac{1}{5} \] of 45
   \[ \frac{1}{5} \] of 60 \[ \frac{1}{5} \] of 30 \[ \frac{1}{5} \] of 35
4. Use +, −, ×, or ÷: \[ 5 \; 7 = 35; 49 \; 7 = 7; 56 \; 8 = 7; 21 \; 8 = 29; 16 \; 7 = 9 \]
5. \[ \frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20} \]

6. Lines on a flat surface that never meet are called ___.
7. Mary ate \( \frac{1}{2} \) of a pizza. Sy ate \( \frac{1}{4} \).
   Who ate more?
8. Ed colored 4 of 6 squares red.
   Is that more or less than half?
9. One sixth of 54 desks is ___ desks.
10. First Mark ate \( \frac{1}{4} \) of his apple.
    Then he ate another \( \frac{1}{4} \). How much of the apple did he eat?
SET 31

1. \[ \frac{3}{4} - \frac{1}{4} = \frac{4}{5} - \frac{2}{5} = \frac{3}{5} \]
2. \[ \frac{7}{8} - \frac{2}{8} = \frac{8}{8} - \frac{5}{8} = \frac{3}{7} \]
3. Read: 0.34; 0.62; 0.73; 0.02; 0.40; 0.07; 0.96
4. Yes or No? 1.2 = 1 \frac{2}{10}; 2.1 = 2 \frac{5}{10}; 3.7 = 3 \frac{7}{10}; 4.5 = 4 \frac{5}{10}; 1.9 = 1 \frac{6}{10}
5. Read: 7.3; 6.8; 5.4; 2.9; 1.7; 3.5; 4.1
6. Add 1.1 to: 2.8; 6.4; 1.7; 8.6; 3.4; 5.3; 9.2; 4.6
7. Mother bought 1.1 yd of blue material and 2.5 yd of red. How much material did she buy?
8. Dan and Sal were riding bikes. Dan rode 2.3 mi. Sal rode 1.9 mi. Who rode farther?
9. There are 12 pieces of fruit in a basket. One third of the fruit are apples. How many are apples?
10. Which is greater: 0.08 or 0.8?

SET 32

1. 0.4, 1.4, 2.4, \(?\), \(?\), \(?\)
2. \(?\) + 11 = 44; \(?\) - 10 = 67; \(?\) x 2 = 40; \(?\) ÷ 3 = 9; 150 + \(?\) = 250; 320 - \(?\) = 20; 5 x \(?\) = 55
3. Add 10,000 to: 7000; 80,000; 4000; 30,000; 6000; 50,000
4. Subtract 2.2 from: 4.6, 2.9, 6.3, 9.5, 7.4, 8.7, 5.5
5. How many equal parts? \(\frac{7}{9}\); \(\frac{1}{5}\); \(\frac{2}{7}\); \(\frac{4}{9}\), \(\frac{5}{6}\)
6. Tanya had \(\frac{1}{2}\) c of sugar. She used \(\frac{1}{4}\) c. How much is left?
7. Penguins live on a 6-mile-long island. Its width is \(\frac{1}{3}\) of its length. How wide is the island?
8. Four boxes of computer paper weigh 36 kg. How much does each box weigh?
9. Than’s zoo ticket costs $6.75. What is his change from $10?
10. Find the sum of 21,000 and 48,300.

SET 33

1. \((9 \times 2) + 1\) \((4 \times 3) + 3\)
\((7 \times 5) + 2\) \((6 \times 2) + 4\)
2. \((8 \div 2) - 3\) \((12 \div 6) - 2\)
\((24 \div 3) - 5\) \((28 \div 4) - 7\)
3. Give the value: 3256, 1598, 24,000, 598, 134, 520
4. Multiply by 7: 10¢, 20¢, 60¢, 30¢, 50¢, 90¢, 80¢, 40¢, 70¢
5. Which are divisible by 2, by 5, and by 10? 20, 12, 15, 50, 35, 40
6. The stadium holds 62,000. If 42,000 are already seated, how many seats are empty?
7. Brian bought 2 T-shirts for $4.95 each. How much change did he receive from $10?
8. Give the standard form for:
\(100,000 + 30,000 + 4000 + 800 + 20 + 7\)
9. \$.06 + $.07 + $.02 + $.03 = 
10. A pie has 8 pieces. Meg ate 1 piece and Ted ate 2. How many pieces are left?
acute angle  An angle less than a right angle.

addend  A number that is added to another number or numbers.

addition  A joining operation on two or more numbers that gives a total.

A.M.  Letters that indicate time from midnight to noon.

angle  The figure formed by two rays that start out from the same point.

area  The number of square units needed to cover a flat surface.

associative (grouping) property  Changing the grouping of the addends (or factors) does not change the sum (or product).

average  A quotient derived by dividing a sum by the number of its addends.

axis  The horizontal or vertical number line of a graph.

bar graph  A graph that uses bars of different lengths to show data.

benchmark  An object of known measure that can be used to estimate the measure of other objects.

calendar  A system used to organize the days of the week into months and years.

capacity  The amount, usually of liquid, that a container can hold.

centimeter (cm)  A metric unit used to measure small objects; 1 cm = 10 dm.

circle  A simple closed curve.

circle graph  A graph that shows data as parts of a whole.

common factor  A number that is a factor of two or more products.

commutative (order) property  Changing the order of the addends (or factors) does not change the sum (or product).

compatible numbers  Two numbers, one of which divides the other evenly.

cone  A solid figure that has one circular base.

congruent figures  Figures that have the same size and the same shape.

cube  A solid figure whose six faces are congruent squares.

cup (c)  A customary unit of capacity; 2 c = 1 pt.

customary system  The measurement system that uses inch, foot, yard, and mile; cup, pint, quart, and gallon; and ounce and pound.

cylinder  A solid figure that has two circular bases.

data  Facts or information.

decimal  A number in base ten that is written with a decimal point.

decimeter (dm)  A metric unit of length equal to 10 cm.

degree Celsius (°C)  A unit for measuring temperature. Water freezes at 0°C.

degree Fahrenheit (°F)  A unit for measuring temperature. Water freezes at 32°F.
denominator The numeral below the bar in a fraction; it names the total number of equal parts.
difference The answer in subtraction.
digit Any one of the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9.
dividend The number to be divided.
divisible One number is divisible by another if it can be divided by that number and yield no remainder.
divisor The number by which the dividend is divided.
edge The line segment where two faces of a solid figure meet.
elapsed time The amount of time between two given times.
endpoint The point at the end of a line segment or ray.
equation (See number sentence.)
equilateral triangle A triangle with all sides equal in length.
equivalent fractions Different fractions that name the same amount.
estimate An approximate answer; to find an answer that is close to an exact answer.
even number Any whole number that has 0, 2, 4, 6, or 8 in the ones place.
expanded form A way to write a number that shows the place value of each of its digits. 400 + 20 + 8
expression A mathematical phrase that has only numbers and operation signs.
fraction A number that names part of a whole or part of a set.
front-end estimation A way of estimating by using the front, or greatest, digits to find an approximate answer.
gallon (gal) A customary unit of capacity; 1 gal = 4 qt.
gram (g) A metric unit used to weigh light objects; 1000 g = 1 kg.
graph A pictorial representation of data.
half gallon A customary unit of capacity; 1half gallon = 2 qt.
half hour A unit of time; \( \frac{1}{2} \) h = 30 min.
hexagon A polygon with six sides.
hour (h) A unit of time; 1 h = 60 min.
identity property (property of one) The product of one and a number is that number.
inch (in.) A customary unit of length; 12 in. = 1 ft.
intersecting lines Lines that meet at a common point.
**isosceles triangle**  A triangle with at least two sides of equal length.

**key**  A symbol that identifies the meaning of each picture in a pictograph.

**kilogram (kg)**  A metric unit used to weigh heavy objects; 1 kg = 1000 g.

**kilometer (km)**  A metric unit of length equal to 1000 meters.

**line**  A straight set of points that goes on forever in opposite directions.

**line of symmetry**  A line on which a figure can be folded so that the two halves exactly match.

**line graph**  A graph that uses lines to show how data changes over time.

**line plot**  A graph that uses Xs on a number line to represent data.

**line segment**  The part of a line between two endpoints.

**liter (L)**  A metric unit used to measure large amounts of liquid; 1 L = 1000 mL.

**mass**  The measure of the amount of matter an object contains.

**mean**  The average of a set of numbers.

**median**  The middle number in a set of numbers arranged in order.

**meter (m)**  A metric unit used to measure long lengths; 1 m = 100 cm.

**metric system**  The measurement system that uses centimeter, decimeter, meter, and kilometer; milliliter and liter; and gram and kilogram.

**mile (mi)**  A customary unit used to measure distance; 1 mi = 5280 ft.

**milliliter (mL)**  A metric unit of capacity. 1000 mL = 1 L

**minus (−)**  A minus symbol indicates subtraction. Read 10 − 8 as 10 minus 8.

**minute (min)**  A unit of time; 60 min = 1 h.

**missing addend**  An unknown addend in addition.

**missing factor**  An unknown factor in multiplication.

**mixed number**  A number made up of a whole number and a fraction.

**mode**  The item in a set of data that occurs most frequently.

**multiplication**  A joining operation on two or more numbers to find a total of equal groups.

**net**  A pattern that can be folded to model a solid figure.

**number line**  A line that is used to show the order of numbers.

**number sentence**  An equation or inequality.

**numerator**  The numeral above the bar in a fraction; it names the number of parts being considered.

**obtuse angle**  An angle greater than a right angle.

**octagon**  A polygon with eight sides.

**odd number**  Any whole number that has 1, 3, 5, 7, or 9 in the ones place.

**ordered pair**  A pair of numbers that is used to locate a point on a graph.

**ounce (oz)**  A customary unit used to weigh small objects; 16 oz = 1 lb.
outcome  A possible result of a probability experiment.

parallel lines  Lines on a flat surface that never intersect.

parallelogram  A quadrilateral that has opposite sides parallel and equal.

pentagon  A polygon with five sides.

perimeter  The distance around a plane figure.

period  A group of three digits set off by commas in a whole number.

perpendicular lines  Lines that intersect at square corners.

pictograph  A graph that uses pictures or symbols to represent data.

pint (pt)  A customary unit of capacity; 1 pt = 2 c.

plane figure  A flat figure.

plus (+)  A plus symbol indicates addition. Read 4 + 5 as 4 plus 5.

P.M.  Letters that indicate time from noon to midnight.

point  An exact location.

polygon  A closed plane figure made up of three or more straight line segments.

pound (lb)  A customary unit used to weigh large objects; 1 lb = 16 oz.

prediction  An educated guess about what will happen.

probability  The chance or likelihood of an event occurring.

product  The answer in multiplication.

pyramid  A solid figure that has a polygon for a base and has triangular faces that meet at a point.

quadrilateral  Any four-sided polygon.

quart (qt)  A customary unit of capacity; 1 qt = 2 pt.

quarter hour  A unit of time; \( \frac{1}{4} \) h = 15 min.

quotient  The answer in division.

range  The difference between the greatest and the least number in a set of data.

ray  The part of a line that starts at an endpoint. It goes on forever in one direction.

rectangle  A quadrilateral with four right angles whose opposite sides are parallel.

rectangular prism  A solid figure whose six faces are rectangles.

reflection (flip)  The movement of a figure over a line so that the figure faces in the opposite direction.

regrouping  Trading one from a place for ten from the next lower place, or ten from a place for one from the next higher place.

remainder  The number left over after dividing.

right angle  An angle that forms a square corner.

right triangle  A triangle that has one right angle.

Roman numerals  Symbols for numbers used by the Romans.

rotation (turn)  The movement of a figure around a point.
rounding Writing a number to the nearest ten or ten cents, hundred or dollar, and so on.

S
scale The numbers along an axis of a graph; the ratio of the length in a drawing to the actual length.
scalene triangle A triangle with no sides of equal length.
side A line segment that forms part of a polygon.
similar figures Figures that have the same shape. They may or may not be the same size.
simplest form The form of a fraction when the numerator and denominator have no common factor other than 1.
solid figure A figure that is not flat but that has volume.
sphere A solid figure that is shaped like a ball.
square A quadrilateral that has four congruent sides and four right angles.
square number A product that can be represented by a square array.
standard form The usual way of using digits to write a number.
subtraction A separating operation on two numbers that results in a difference.
sum The answer in addition.
survey A way to collect data to answer a question.

T
tally A count made by using tally marks.
temperature The measurement of how cool or warm something is.
thermometer An instrument used to measure temperature.

trading (See regrouping.)
transformation A movement that changes the location of a figure.
translation (slide) The movement of a figure in a straight line without changing direction.
trapezoid A quadrilateral with only one pair of parallel sides.
tree diagram A diagram that shows all possible combinations.
triangle A polygon with three sides.

U
unit cost The cost of one item.

V
variable A letter or symbol that stands for an unknown number.
vertex (plural vertices) The place where two or more lines or edges of a figure meet.
volume The number of cubic units a solid figure contains.

W
weight The heaviness of an object.
whole number Any of the numbers such as 0, 1, 2, 3, 4, . . .

Y
yard (yd) A customary unit used to measure length; 1 yd = 3 ft.

Z
zero (identity) property of addition The sum of zero and a number is that number.
zero property of multiplication The product of zero and a number is zero.
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### Mathematical Symbols

- $=\,$ is equal to
- $\neq\,$ is not equal to
- $<\,$ is less than
- $>\,$ is greater than
- $\$\,$ dollars
- $\cent\,$ cents
- $\cdot\,$ decimal point
- $\circ\,$ degree
- $\pm\,$ plus
- $\mp\,$ minus
- $\times\,$ times
- $\div\,$ divided by
- $\overrightarrow{AB}\,$ line $AB$
- $\overrightarrow{AB}\,$ line segment $AB$
- $\overrightarrow{AB}\,$ ray $AB$
- $\angle ABC\,$ angle $ABC$
- $\parallel\,$ is parallel to
- $\perp\,$ is perpendicular to
- $(3, 4)\,$ ordered pair

### Table of Measures

#### Metric Units

<table>
<thead>
<tr>
<th>Length</th>
<th>Capacity</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 centimeters (cm) = 1 meter (m)</td>
<td>1000 milliliters (mL) = 1 liter (L)</td>
<td>1000 grams (g) = 1 kilogram (kg)</td>
</tr>
<tr>
<td>10 centimeters = 1 decimeter (dm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 decimeters = 1 meter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 meters = 1 kilometer (km)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Customary Units

<table>
<thead>
<tr>
<th>Length</th>
<th>Capacity</th>
<th>Weight</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 inches (in.) = 1 foot (ft)</td>
<td>8 fluid ounces (fl oz) = 1 cup (c)</td>
<td>16 ounces (oz) = 1 pound (lb)</td>
<td>60 seconds (s) = 1 minute (min)</td>
</tr>
<tr>
<td>3 feet = 1 yard (yd)</td>
<td>2 cups = 1 pint (pt)</td>
<td>2000 pounds = 1 ton (T)</td>
<td>60 minutes = 1 hour (h)</td>
</tr>
<tr>
<td>36 inches = 1 yard</td>
<td>2 pints = 1 quart (qt)</td>
<td></td>
<td>24 hours = 1 day (d)</td>
</tr>
<tr>
<td>5280 feet = 1 mile (mi)</td>
<td>4 quarts = 1 gallon (gal)</td>
<td></td>
<td>7 days = 1 week (wk)</td>
</tr>
<tr>
<td>1760 yards = 1 mile</td>
<td></td>
<td></td>
<td>12 months (mo) = 1 year (yr)</td>
</tr>
</tbody>
</table>

#### Money

| 1 nickel = 5¢ or $ .05 | 2 nickels = 1 dime |
| 1 dime = 10¢ or $ .10 | 10 dimes = 1 dollar |
| 1 quarter = 25¢ or $ .25 | 4 quarters = 1 dollar |
| 1 half dollar = 50¢ or $ .50 | 2 half dollars = 1 dollar |
| 1 dollar = 100¢ or $1.00 | | |

### Time

- 60 seconds (s) = 1 minute (min)
- 60 minutes = 1 hour (h)
- 24 hours = 1 day (d)
- 7 days = 1 week (wk)
- 12 months (mo) = 1 year (yr)
- 52 weeks = 1 year
- 365 days = 1 year
- 366 days = 1 leap year
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