

Solving Multi-Step Ratio Problems

► Solve each problem.

- 1 At The Green House of Salad, you get a \$1 coupon for every 3 salads you buy. What is the least number of salads you could buy to get \$10 in coupons?
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- 2 Kim orders catering from Midtown Diner for \$35. She spends \$5 on a large order of potato salad and the rest on turkey sandwiches. Each sandwich is \$2.50. How many sandwiches does Kim buy?
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- 3 Molly and Liza are exercising. Molly does 10 push-ups at the same time as Liza does 15 push-ups. When Molly does 40 push-ups, how many push-ups does Liza do?
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- 4 A shark swims at a speed of 25 miles per hour. The shark rests after 40 miles. How long, in minutes, does the shark swim before resting?
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- 5 Ali and Janet are selling gifts at a local craft show. For every bar of soap that Ali sells, she earns \$5. For every mug that Janet sells, she earns twice as much as Ali. Ali sells 5 bars of soap, and Janet sells 7 mugs. How much money did they make altogether?
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- 6 Ted is making trail mix for a party. He mixes $1\frac{1}{2}$ cups of nuts, $\frac{1}{4}$ cup of raisins, and $\frac{1}{4}$ cup of pretzels. How many cups of pretzels does Ted need to make 15 cups of trail mix?
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- 7 The ratio of chaperones to students on a field trip is 2 : 7. There are 14 chaperones on the field trip. In all, how many chaperones and students are there?
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- 8 Dayren is driving to visit family. She drives at an average of 65 miles per hour. She drives 227.5 miles before lunch and then 97.5 miles after lunch. How many hours did she spend driving?
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Solving Problems Involving Multiple Percents

► **Solve each problem.**

- 1 A chair's regular price is \$349. It is on clearance for 30% off, and a customer uses a 15% off coupon after that. What is the final cost of the chair before sales tax?
- 2 A calculator is listed for \$110 and is on clearance for 35% off. Sales tax is 7%. What is the cost of the calculator?
- 3 Cara started working for \$9 per hour. She earns a 4% raise every year. What is her hourly wage after three years?
- 4 A factory manufactures a metal piece in 32 minutes. New technology allowed the factory to cut that time by 8%. Then another improvement cut the time by 5%. How long does it take to manufacture the piece now? Round your answer to the nearest minute.
- 5 An apartment costs \$875 per month to rent. The owner raises the price by 20% and then gives a discount of 8% to renters who sign an 18-month lease. How much less do renters who sign an 18-month lease pay per month to rent the apartment?

Solving Problems Involving Multiple Percents *continued*

- 6 Damon buys lumber worth \$562. He gets a 20% contractor's discount. The sales tax is 6%. His credit card gives him 2% off. How much does he pay?
- 7 Cindy is shopping for a television. The original price is \$612. Store A has the television on clearance for 30% off. Store B has it on clearance for 25% off, and Cindy has a 10% off coupon to use at Store B. At which store will she pay less? How much less?
- 8 John goes to a restaurant and has a bill of \$32.57. He uses a 10% off coupon on the cost of the meal. The tax is 8%. He leaves a tip of 18% on the amount before the coupon or tax is applied. How much does he spend?
- 9 Explain which situation will give you the best price: a discount of 15% and then 10% off that amount, a discount of 10% and then 15% off that amount, or a discount of 25%.

Solving Problems Involving Percent Change

► Find the percent change and tell whether it is a percent increase or a percent decrease.

1 Original amount: 20
End amount: 15

2 Original amount: 30
End amount: 45

3 Original amount: 625
End amount: 550

4 Original amount: 320
End amount: 112

5 Original amount: 165
End amount: 222.75

6 Original amount: 326
End amount: 423.80

7 Original amount: 27
End amount: 38.61

8 Original amount: 60
End amount: 70.02

9 How do you know when a situation involves a percent increase or a percent decrease?

Solving Problems Involving Percent Error

► Solve each problem. Round to the nearest hundredth of a percent if needed.

1 Mrs. Rowan allotted 30 minutes at the beginning of class for her students to complete an exam. The last student took 42 minutes to complete the exam. What is Mrs. Rowan's percent error?

2 Harper needs to mail an envelope. She weighs it at home as 10.4 ounces. When she gets to the post office, the clerk weighs it at 9.6 ounces. What is the percent error in the weight of the envelope?

3 An airline ticket states that the flight takes 2 hours and 45 minutes. The flight time is actually 2 hours and 54 minutes. What is the percent error in the flight time?

4 Luna buys a shirt that costs \$15.65. She gives the cashier \$20 and receives \$3.25 in change. What is the percent error in the amount of change she was given?

5 Judy thinks there will be 325 people at the county fair on Friday, while Atticus thinks there will be 600 people. On Friday, 452 people attend the fair. Who is closer in their estimate? What is the difference between the percent errors?

6 Sussex County received 43 inches of rainfall this year. The percent error in the local meteorologist's rainfall prediction was about 18.02%. What are two possible values for the meteorologist's prediction?

Expanding Expressions

► Expand each expression and combine like terms if possible.

1 $4(x - 2)$

2 $-3(x + 7)$

3 $-4(-x - 8)$

4 $\frac{1}{3}(x - 9)$

5 $-\frac{1}{4}(x + 16)$

6 $-\frac{1}{5}(-x - 35)$

7 $\frac{2}{3}(x + 18 - 2x)$

8 $\frac{3}{4}(16x - 27 - 1)$

9 $-12\left(\frac{5}{6}x - 5\right) + 2x$

► Determine which expressions, if any, are equivalent. Show your work.

10 $4(x - 3)$

$6x - 2(x - 3)$

$x + 3(x - 2) - 6$

Expanding Expressions *continued*

11 $\frac{1}{3}(9x + 16 + 2) + 2x$

$7x + 14 - 2(x + 4)$

$x - 3 + 7(x + 3) - 3x - 12$

12 Use two different methods to expand $\frac{1}{4}(x + 2x + 16 - 8)$.

Factoring Expressions

► Factor each expression.

1 $8a + 16$

2 $12x - 20$

3 $-6a + 18$

4 $-14w - 21$

5 $8a - 12b + 28$

6 $-6x + 15y - 24$

7 $2a + 3 + 7a$

8 $-2x - 8x + 20$

9 $5y + 10 - 25y$

- 10 Simplify $(4x + 7) - (-3x - 9) + 9x - 28$. Then rewrite in factored form, if possible. Show your work.

Writing and Solving Equations with Two or More Addends

► Solve each equation. The answers are mixed up at the bottom of the page. Cross out the answers as you complete the problems.

1 $8x + 15 = 63$

2 $9x - 13 = 23$

3 $135 = 2x + 25$

4 $33 = 32x - 31$

5 $12x - 16 = 68$

6 $7x + 115 = 136$

7 $82 = 4x + 14$

8 $2x - 56 = 34$

9 $3x - 4\frac{1}{2} = -19\frac{1}{2}$

10 $10 = -\frac{1}{4}x + 12$

11 $6x + 4.59 = 11.19$

12 $25.68 = 2x - 6.32$

Answers

$x = 1.1$

$x = 45$

$x = -5$

$x = 6$

$x = 7$

$x = 16$

$x = 4$

$x = 55$

$x = 17$

$x = 8$

$x = 2$

$x = 3$

Writing and Solving Inequalities

► Write and solve an inequality to answer each question.

1 Tetsuo has 50 arcade tokens. Each arcade game at RetroRama costs 4 tokens. How many games can Tetsuo play?

2 Kimberly has \$120 to spend at the bookstore. Kimberly buys a hardcover book for \$36, as well as some gift cards for her family and friends. Each gift card is \$15. How many gift cards can Kimberly buy?

3 Kwame has a budget of \$720 for his college class. He buys a laptop for \$330 and wants to use the rest to buy computer programs. Each program costs \$60. How many programs can Kwame purchase?

4 A farmer ties 4 bags on his mule. If the mule can carry up to 200 lb and each bag weighs 30 lb, how many more bags can the mule carry?

Writing and Solving Inequalities *continued*

- 5 Helga signs up to coach hockey. She wants to make at least \$775 during the season. She gets \$200 at the start of the season and \$50 for each practice session she has. How many practice sessions does Helga need to have this season?

- 6 Logan has a budget of \$400 to have family pictures taken. There is a sitting fee of \$38. Prints cost \$25 per page. How many pages of prints can Logan order?

- 7 At TopLine's 50th anniversary celebration, managers and assistants earn custom-engraved plaques in recognition of their outstanding performance. TopLine purchased a total of 81 plaques for the event. The company gives 25 plaques to the managers and at least 2 plaques to each assistant. What is the maximum number of assistants at the event?

- 8 A cartoonist has 150 pieces of original artwork to give to his publishers and some fans who won his online contest. He plans to send 30 drawings to his publishers. He is sending at least 3 pieces of artwork to each contest winner. How many contest winners could there be?
