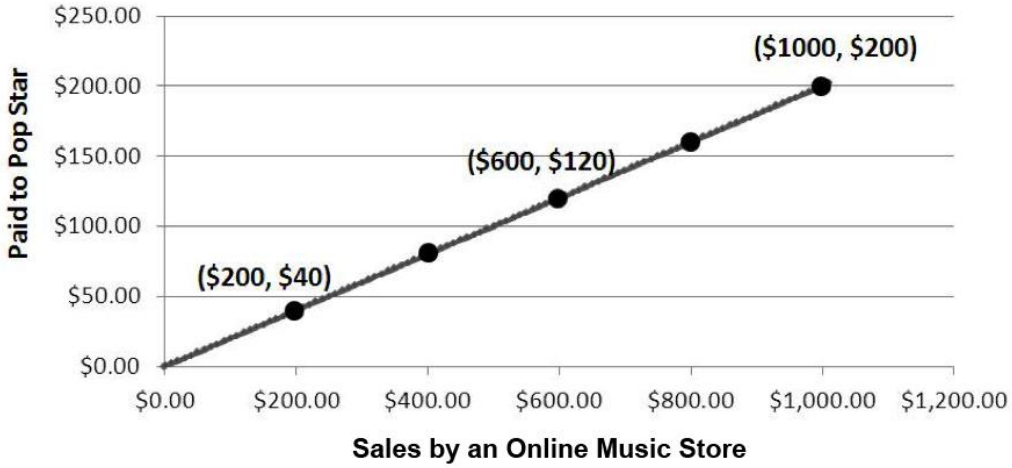
Blessed Sacrament School
Incoming 8th Grade
Summer Math Review

1. Josiah and Tillery have new jobs at YumYum's Ice Cream Parlor. Josiah is Tillery's manager. In their first year, Josiah will be paid $\$14$ per hour, and Tillery will be paid $\$7$ per hour. They have been told that after every year with the company, they will each be given a raise of $\$2$ per hour. Is the relationship between Josiah's pay and Tillery's pay rate proportional? Explain your reasoning using a table.

2. A recent study claimed that in any given month, for every 5 text messages a boy sent or received, a girl sent or received 7 text messages. Is the relationship between the number of text messages sent or received by boys proportional to the number of text messages sent or received by girls? Explain your reasoning using a graph on the coordinate plane.

3. When a song is sold by an online music store, the store takes some of the money, and the singer gets the rest. The graph below shows how much money a pop singer makes given the total amount of money brought in by one popular online music store from sales of the song.



   a. Identify the constant of proportionality between dollars earned by the pop singer and dollars brought in by sales of the song.

   b. ite an equation relating dollars earned by the pop singer, y, to dollars brought in by sales of the song, x.

c. According to the proportional relationship, how much money did the song bring in from sales in the first week if the pop star earned $\$800$ that week?

d. Describe what the point $(0,0)$ on the graph represents in terms of the situation being described by the graph.

e. Which point on the graph represents the amount of money the pop singer gets for $\$1$ in money brought in from sales of the song by the store?

4. It is a Saturday morning, and Jeremy has discovered he has a leak coming from the water heater in his attic. Since plumbers charge extra to come out on weekends, Jeremy is planning to use buckets to catch the dripping water. He places a bucket under the drip and steps outside to walk the dog. In half an hour, the bucket is $\frac{1}{5}$ of the way full.

a. What is the rate at which the water is leaking per hour?

b. Write an equation that represents the relationship between the number of buckets filled, y, in x hours.

c. What is the longest that Jeremy can be away from the house before the bucket will overflow?

5. What value of a will make the equation a true statement? Explain how you arrived at your solution.

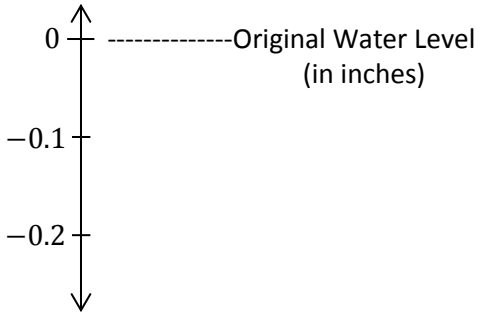
$$\left(-\frac{3}{4}+\frac{4}{3}\right)+a=0$$

6. Every month, Ms. Thomas pays her car loan through automatic payments (withdrawals) from her savings account. She pays the same amount on her car loan each month. At the end of the year, her savings account balance changed by $-\$2{,}931$ from payments made on her car loan.

a. What is the change in Ms. Thomas' savings account balance each month due to her car payment?

7. The water level in Ricky Lake changes at an average of $-\frac{7}{16}$ inch every 3 years.

a. Based on the rate above, how much will the water level change after one year? Show your calculations and model your answer on the vertical number line, using 0 as the original water level.



b. How much would the water level change over a 7-year period?

c. When written in decimal form, is your answer to part (b) a repeating decimal or a terminating decimal? Justify your answer using long division.

8. Kay's mother taught her how to make handmade ornaments to sell at a craft fair. Kay rented a table at the fair for $\$30$ and set up her work station. Each ornament that she makes costs approximately $\$2.50$ for materials. She sells each ornament for $\$6.00$.

a. If x represents the number of ornaments sold at the craft fair, which of the following expressions would represent Kay's profit? (Circle *all* choices that apply.)

A. $-30 + 6x - 2.50x$

B. $6x - 30 - 2.50x$

C. $6x - 30$

D. $4.50x - 30$

E. $3.50x - 30$

b. Kay does not want to lose money on her business. Her mother told her she needs to sell enough ornaments to at least cover her expenses (costs for materials and table rental). Kay figures that if she sells 8 ornaments, she covers her expenses and does not lose any money. Do you agree? Explain and show work to support your answer.

c. Kay feels that if she earns a profit of $\$40.00$ at this craft fair, her business will be successful enough for her to branch out to other craft fairs. How many ornaments does she have to sell to earn a $\$40.00$ profit? Write and solve an equation; then explain how the steps and operations used in your algebraic solution compare to an arithmetic solution.

9. Travis received a letter from his bank saying that his checking account balance fell below zero.

His account transaction log is shown below.

CHECK NO.	DATE	DESCRIPTION OF TRANSACTION	PAYMENT	DEPOSIT	BALANCE	
---	10/17	Beginning Balance	---	---	$\$367.50$	
1125	10/18	CBC Audio (Headphones)	$\$62.00$		-62.00	
					$\$305.50$	Line 1
1126	10/22	NY Sport (Basketball Shoes)	$\$87.00$		-87.00	
					$\$218.50$	Line 2
Debit	10/25	Gary's Country Market	$\$38.50$		-38.50	
					$\$180.00$	Line 3
1127	10/25	Iggy's Skate Shop (Skateboard)	$\$188.00$		-188.00	
					$\$8.00$	Line 4
	10/25	Cash Deposit (Birthday Money)		$\$20.00$	$+20.00$	
					$\$28.00$	Line 5
Debit	10/30	McDonuts	$\$5.95$		-5.95	
					$\$22.05$	Line 6

a. On which line did Travis make a mathematical error? Explain Travis's mistake.

b. The bank charged Travis a $\$20$ fee because his balance dropped below $\$0$. He knows that he currently has an outstanding charge for $\$7.85$ that he has not recorded yet. How much money will Travis have to deposit into his account so that the outstanding charge does not create another bank fee? Explain.

b. Describe the total change to Ms. Thomas' savings account balance after making six monthly payments on her car loan. Model your answer using a number sentence.

10. Use the expression below to answer part (a)

$$4x - 3(x - 2y) + \frac{1}{2}(6x - 8y)$$

a. Write an equivalent expression in standard form, and collect like terms.

11. Use the information to solve the problems below.

b. The longest side of a triangle is six more units than the shortest side. The third side is twice the length of the shortest side. If the perimeter of the triangle is 25 units, write and solve an equation to find the lengths of all three sides of the triangle.

c. The length of a rectangle is $(x + 3)$ inches long, and the width is $3\frac{2}{5}$ inches. If the area is $15\frac{3}{10}$ square inches, write and solve an equation to find the length of the rectangle.

d.

12. In August, Cory begins school shopping for his triplet daughters.

e. One day, he bought 10 pairs of socks for $\$2.50$ each and 3 pairs of shoes for d dollars each. He spent a total of $\$135.97$. Write and solve an equation to find the cost of one pair of shoes.

f. The following day Cory returned to the store to purchase some more socks. He had $\$40$ to spend. When he arrived at the store, the shoes were on sale for $\frac{1}{3}$ off. What is the greatest amount of pairs of socks Cory can purchase if he purchases another pair of shoes in addition to the socks?

13. Ben wants to have his birthday at the bowling alley with a few of his friends, but he can spend no more than $\$80$. The bowling alley charges a flat fee of $\$45$ for a private party and $\$5.50$ per person for shoe rentals and unlimited bowling.

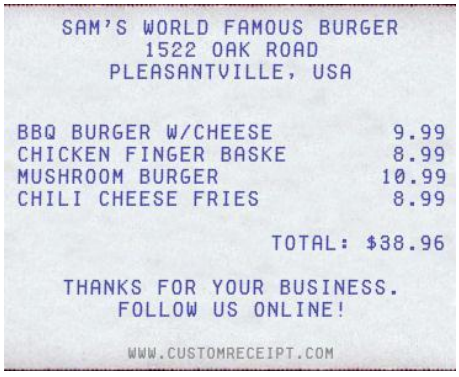
a. Write an inequality that represents the total cost of Ben's birthday for p people given his budget.

b. How many people can Ben pay for (including himself) while staying within the limitations of his budget?

c. Graph the solution of the inequality from part (a).

14. Kacey and her three friends went out for lunch, and they wanted to leave a 15% tip. The receipt shown below lists the lunch total before tax and tip. The tip is on the cost of the food plus tax. The sales tax rate in Pleasantville is 8.75%.

a. Use mental math to estimate the approximate total cost of the bill including tax and tip to the nearest dollar. Explain how you arrived at your answer.



SAM'S WORLD FAMOUS BURGER
1522 OAK ROAD
PLEASANTVILLE, USA

BBQ BURGER W/CHEESE	9.99
CHICKEN FINGER BASKE	8.99
MUSHROOM BURGER	10.99
CHILI CHEESE FRIES	8.99

TOTAL: $38.96

THANKS FOR YOUR BUSINESS.
FOLLOW US ONLINE!

WWW.CUSTOMRECEIPT.COM

b. Find the actual total of the bill including tax and tip. If Kacey and her three friends split the bill equally, how much will each person pay including tax and tip?

15. Cool Tees is having a Back to School sale where all t-shirts are discounted by 15%. Joshua wants to buy five shirts: one costs $\$9.99$, two cost $\$11.99$ each, and two others cost $\$21.00$ each.

a. What is the total cost of the shirts including the discount?

b. By law, sales tax is calculated on the discounted price of the shirts. Would the total cost of the shirts including the 6.5% sales tax be greater if the tax was applied before a 15% discount is taken, rather than after a 15% discount is taken? Explain.

c. Joshua remembered he had a coupon in his pocket that would take an additional 30% off the price of the shirts. Calculate the new total cost of the shirts including the sales tax.

d. If the price of each shirt is 120% of the wholesale price, write an equation and find the wholesale price for a $\$21$ shirt.

16. The water level in a swimming pool increased from 4.5 feet to 6 feet. What is the percent increase in the water level rounded to the nearest tenth of a percent? Show your work.

Round all decimal answers to the nearest hundredth.

17. Each student in a class of 38 students was asked to report how many siblings (brothers and sisters) he has. The data are summarized in the table below.

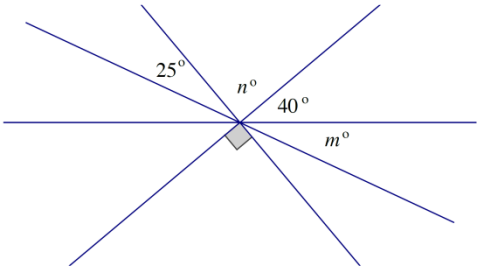
Number of Siblings	0	1	2	3	4	5	6
Count	8	13	12	3	1	0	1

a. Based on the data, estimate the probability that a randomly selected student from this class is an only child.

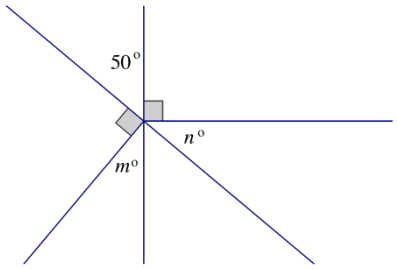
b. Based on the data, estimate the probability that a randomly selected student from this class has three or more siblings.

18. In each problem, set up and solve an equation for the unknown angles.

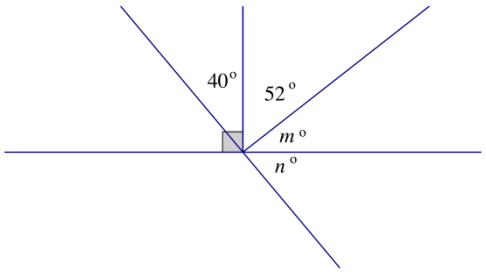
a. Four lines meet at a point. Find the measures $m°$ and $n°$.



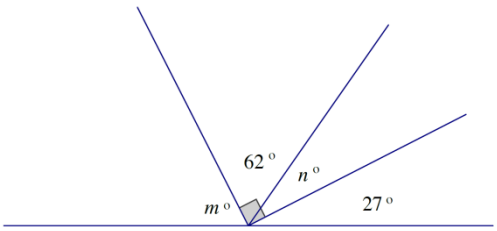
b. Two lines meet at the vertex of two rays. Find the measures $m°$ and $n°$.



c. Two lines meet at a point that is the vertex of two rays. Find the measures $m°$ and $n°$.



g. Three rays have a common vertex on a line. Find the measures $m°$ and $n°$.



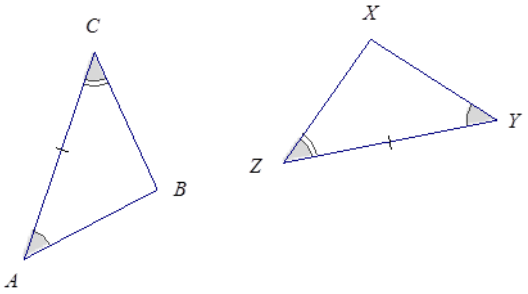
19. Use tools to construct a triangle based on the following given conditions.

a. If possible, use your tools to construct a triangle with angle measurements $20°$, $55°$, and $105°$, and leave evidence of your construction. If it is not possible, explain why.

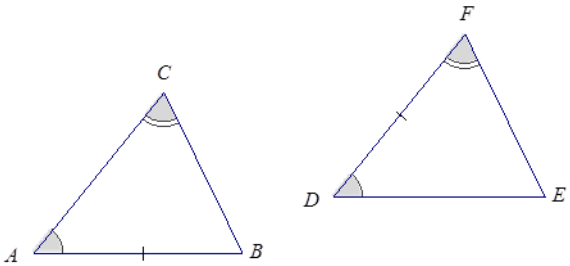
b. Is it possible to construct two different triangles that have the same angle measurements? If it is, construct examples that demonstrate this condition, and label all angle and length measurements. If it is not possible, explain why.

20. In each of the following problems, two triangles are given. For each: (1) state if there are sufficient or insufficient conditions to show the triangles are identical, and (2) explain your reasoning.

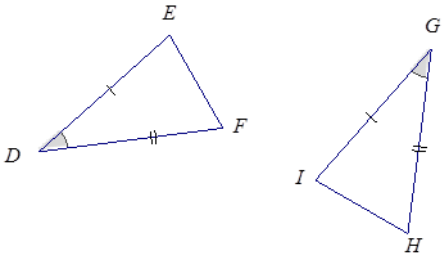
a.



b.



c.



21. A circular patio has a diameter of 35 yards. What is the circumference of the patio? Use $\frac{22}{7}$ for π.

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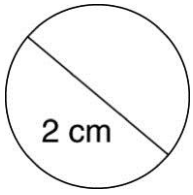
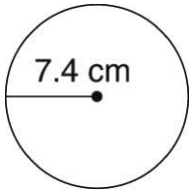
22. A paper plate has a diameter of 9 inches. What is the circumference of the plate? Use $\frac{22}{7}$ for π.

Find the area of each circle. Round to the nearest tenth. Use 3.14 for π.

23. 

24. 

25. A vanilla cake has a diameter of 8 inches. A chocolate cake has a diameter of 10 inches. What is the difference in area between the top surfaces of the two cakes? Use 3.14 for π.

_____

COMPUTATION PRACTICE (DO NOT USE A CALCULATOR)

Find each sum.

1. $-7 + (-1) =$ _____
2. $-5 + (-4) =$ _____
3. $-36 + (-17) =$ _____
4. $-51 + (-42) =$ _____
5. - 4 + 9 = _____
6. 6 + (-9) = _____
7. 5 + (-7) = _____
8. (-1) + 9 = _____

Find the difference.

9. -6 – 4 = _____
10. -7 - (-12) = _____
11. 12 – 16 = _____
12. 5 - (-19) = _____
13. -18 - (-18) = _____
14. 23 - (-23) = _____

Find each product.

15. $(-4)(7)$ = _____

16. $(-3)(-4)$ = _____

17. $(6)(-6)$ = _____

17. $40(-78)(0)$ = _____

18. $-6(-60)(-4)$ = _____

19. $-24(7)(-7)$ = _____

Find each quotient.

20. $7\overline{)-84}$

_____

21. $-38 \div -2$

_____

22. $-27\overline{)81}$

_____

23. $-28 \div 7$

_____

24. $-121 \div -11$

_____

25. $-35 \div 4$

_____

Simplify.

26. $(-6-4) \div 2$

27. $5(-8) \div 4$

28. $-6(-2) \div 4(-3)$

29. $-\frac{3}{4} + \frac{1}{5}$

30. $-2\frac{1}{4} - (-3)$

31. $\left(\frac{2}{3}\right) \times (-6) \times 5$

32. $\frac{1}{2} \div (-3)$

33. $24 \div (-3.2)$

34. $\frac{\left(\frac{3}{2}\right)}{\left(-\frac{9}{8}\right)} =$