2026 Summer Math Packet for Incoming Algebra I Students

Welcome to the 2026-2027 school year! The attached packet has been developed to help you prepare for Algebra I. Please space out your work on the packet, making a goal of **20 minutes per day, three days per week** on average. The packets will be collected the first week of school, and will count as an assessment grade for fall trimester. Packets will be graded for effort, completion and accuracy.

Please spend the time needed to do a quality job on this packet. Show and organize your work for each problem. Avoid using a calculator whenever possible, write down your calculations, and show all of your work!

If you don't remember how to solve a particular type of math problem, please use Khan Academy and IXL as resources. Both have excellent tutorials.

Enjoy your summer vacation, and keep your education moving forward during this break.

For the start of Algebra I, you will need a red 3 subject notebook for notes, a red folder for handouts, plenty of pencils and a **large eraser** for daily work, and a calculator (preferably TI-30Xa, but another scientific calculator will be fine).

If you have any questions, I am available at hgeiser@stlukesri.org throughout the summer to answer any questions.

Best wishes,
Mrs. Geiser

Central Tendencies
(Mean, Median, Mode, and Range)

Mean is the sum of the values in a set of data divided by the number of values.

Median is the middle value of a set of data written in ascending order. If there are two middle values, the median is the mean of those values.

Mode is the most frequent value in a set of data.

Range is the difference between the greatest and least value in a set of data.

Exercises:

Find the mean, median, mode, and range of each set of data.

1. 108, 93, 426, 766, 518, 210

2. 21.5, 35.5, 49.5, 16.3, 35.5

Fractions
(Addition, Subtraction, Multiplication, and Division)

Miscellaneous

Write the fractions in lowest terms.

1. $\frac{8}{24}$

2. $\frac{18}{24}$

3. $\frac{15x^2y}{20xy}$

4. $\frac{36abc^4}{45a^3bc^2}$

Solve for x.

5. $\frac{16}{48} = \frac{x}{12}$

6. $\frac{12}{42} = \frac{4}{x}$

7. $\frac{20}{32} = \frac{x}{16}$

8. $\frac{6}{9} = \frac{12}{x}$

Write as improper fractions.

9. $2\frac{1}{3}$

10. $-4\frac{6}{7}$

Write as mixed numbers.

11. $-\frac{9}{4}$

12. $\frac{38}{3}$

Addition and Subtraction

Find each sum or difference. Write your answer in simplest form.

13. $-\frac{2}{3}+\frac{1}{4}$

14. $3\frac{5}{9}+2\frac{1}{6}$

15. $\frac{3}{10}-\frac{4}{5}$

16. $6\frac{7}{10}+\left(-1\frac{1}{5}\right)$

17. $5\frac{4}{11}-2\frac{2}{3}$

18. $2\frac{7}{12}-9\frac{2}{3}$

Multiplication and Division

Find each product or quotient. Write your answer in simplest form.

19. $-\frac{5}{6}\cdot\frac{6}{15}$

20. $-\frac{3}{4}\div\left(-\frac{9}{16}\right)$

21. $2\frac{2}{5}\cdot\left(-3\frac{3}{4}\right)$

22. $-3\frac{3}{4}\div 4\frac{2}{3}$

23. $\frac{2}{9}\cdot\frac{3}{16}\cdot\frac{3}{6}$

24. $6\frac{3}{4}\div 4$

Order of Operations

When several operations are indicated in a numerical expression, proceed in the following order: work within the parentheses, expand each power, multiply and divide (whichever comes first), and finally, add or subtract (whichever comes first).

PEMDAS ("**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally") is an acronym that provides a good way to remember your order of operation.

- **P**: Parentheses
- **E**: Exponents
- **MD**: Multiply or Divide, whichever comes first
- **AS**: Add or Subtract, whichever comes first

Simplify.

1. $2^4 - 3(3^2 - 8)$

2. $(4^2 + 10)4 - 10(5^2 - 20)$

3. $4^2 - 4(5^2 - 32 \div 8 \cdot 4)$

4. $(8 \cdot 5 \div 10 + 2)(2^5 - 8^2 \div 2)$

5. $5^2 - 3\big[6 + (-2)\big(20 + (-15)\big)\big]$

6. $[4^3 + (-10)(30 - 8 \cdot 5)]$

7. $[15 - 3(4^2 - 10) + 25 \div 5 \cdot 15]$

8. $\{10 - 5[20 - 2(3^2 + 1)]\}$

9. $|-32| + 32$

10. $\frac{48-24\div 2^3}{3+2\cdot 6}$

Working with Integers

Adding and Subtracting:

1st: Rewrite all subtraction as addition then…

- If the integers have the same signs, add their absolute values. The sum will have the same sign of the addends.
- If the integers have different signs, subtract their absolute values. The sum has the sign of the addend with the greater absolute value.

Multiplying and Dividing:

- The product or quotient of two integers having the same sign is positive.
- The product or quotient of two integers having different signs is negative.

Find each sum, difference, product, or quotient.

1. $-13 + 19$

2. $37 + (-13)$

3. $-18 + (-29)$

4. $-27 - 93$

5. $-46 - (-32)$

6. $9 - 83$

7. $-45 \div 9$

8. $-84 \div -12$

9. $\frac{132}{-11}$

10. $8(-17)$

11. $-24 \cdot -6$

12. $-62(8)$

13. There is a 6° drop in temperature over the past hour. If it is 55° now, what was the temperature an hour ago?

14. It is $-9°$ now. The temperature will drop 5° in two hours. What will the temperature be in two hours?

Evaluating Expressions and Formulas

To evaluate an expression, first replace the variable by a given value. Then simplify the resulting numerical expression.

Evaluate the expression when $x = -2$ and $y = 5$.

1.	$x + y$	2.	$x^2 + y^3$
3.	$2x - y$	4.	$-2(y - 2x)$
5.	$\frac{3x-y}{11}$	6.	$\frac{x}{3-y}$

Properties of Operations

Commutative Property of Addition:
$a + b = b + a$

Commutative Property of Multiplication:
$a \times b = b \times a$

Associative Property of Addition:
$(a + b) + c = a + (b + c)$

Associative Property of Multiplication:
$(a \times b) \times c = a \times (b \times c)$

Identity Property of Addition:
$a + 0 = a$

Identity Property of Multiplication:
$a \times 1 = a$

Name the property illustrated by each expression.

1.	$8 \times 12 = 12 \times 8$	2.	$3 \times (2 \times 5) = (3 \times 2) \times 5$
3.	$2 + 5 + 12 = 5 + 2 + 12$	4.	$xy + 0 = xy$
5.	$1x = x$	6.	$5 + 7 = 7 + 5$
7.	$3 + (4 + 5) = 3 + (5 + 4)$	8.	$3xy = 3xy(1)$
9.	$(4 + 8) + 5 = 4 + (8 + 5)$	10.	$5 \times 6 \times 8 = 8 \times 5 \times 6$

Solving Multi-Step Equations

Procedure: To solve multi-step equations…

1. Fully simplify both sides of the equation
2. Get all variables to one side of the equation.
3. Use inverse operations to isolate the variable
   undo addition and subtraction first

Ex.

$$\begin{array}{rcl} 2x + \cancel{3} & = & 7 \\ \cancel{-3} & & -3 \\ \hline \frac{\cancel{2}x}{\cancel{2}} & = & \frac{4}{2} \end{array}$$

$$\boxed{x = 2}$$

Ex.

$$\begin{array}{rcl} 2(x + 5) & = & 3x - 5 \\ \cancel{2x} + 10 & = & 3x - 5 \\ -\cancel{2x} & & -2x \\ \hline 10 & = & x - \cancel{5} \\ +5 & & \cancel{+5} \\ \hline \end{array}$$

$$\boxed{x = 15}$$

Exercises

Solve and check each equation.

1. $-2x + 7 = 25$

2. $3 - 8x = -141$

3. $15 - 2(w + 5) = 11$

4. $12 - 4r = 6r + 2$

5. $-4(n + 5) = -32$

6. $12 - 2x + 5 = -1$

7. $3 - 2x = 15$

8. $\frac{z}{2} - 7 = 12$

9. $17 + 3x = 4x - 9$

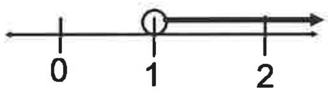
10. $-3(6f - 12) = 36 - 18f$

Solving Multi-Step Inequalities

Note: Solve a multi-step inequality just like you would solve a multi-step equation. However, if you multiply or divide both sides of an inequality by a negative number, then the inequality sign reverses.

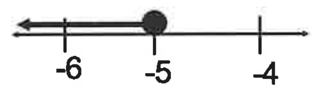
Ex.

$$2x + \cancel{5} > 7$$
$$\underline{\quad -\cancel{5} \quad -5}$$
$$\frac{\cancel{2}x}{\cancel{2}} > \frac{2}{2}$$
$$\boxed{x > 1}$$



Ex.

$$10 \leq -2(x - 4)$$
$$10 \leq -2x + \cancel{8}$$
$$\underline{-8 \qquad\quad -\cancel{8}}$$
$$\frac{10}{-2} \leq \frac{-2x}{-2}$$
$$\boxed{-5 \geq x \text{ or } x \leq -5}$$



Exercises

Find and graph the solution set of each inequality.

1. $3x + 8 > 17$

2. $-6y + 3 > 9 - 7y$

3. $2v + 7 \geq 11$

4. $7 > 3 + \frac{b}{3}$

5. $\frac{c-2}{3} \leq 4$

6. $4b + 4 < 4(5 - 3b)$

7. $2z - 5 < -21 - 2z$

8. $8b - 10 \geq 6(3 - a)$

9. $3x - 5 > 6x + 13$

1. $7(y + 5) - 10 \leq 2y$

Linear Functions

Exercises

Tell whether each ordered pair is a solution of the equation.

1. $3x + y = -11, (-4, 1)$

2. $2x - y = 4, \ (3, -2)$

Find the intercepts of the equations graph.

3. $3x - 4y = -12$

4. $y = -2x - 8$

Find the slope through the given points.

5. $(4, 7), (-3, 6)$

6. $(-5, 7), (-5, -14)$

Identify the slope and y-intercept of the line with the given equation.

7. $y = 2x - 12$

8. $2x - 3y = -6$

Write an equation of the line that is parallel to the given line and passes through the given point.

9. $y = -2x - 6, \ (0, -4)$

10. $-2x + 3y = 12, \ (3, 2)$

Graph the equation using any method.

11. $y = 2x - 3$

12. $-2x - 3y = 12$

1. Six friends are going to buy pizza. Their choices are to buy 2 medium 10-inch diameter pizzas for \$7.00 each or 1 large 14-inch diameter pizza for \$15.00. Both include tax and tip. The friends agree that their best choice is the one that gives them the most pizza for their money.

   Which is the best choice? Explain your answer.

2. Rachel says the sum of a positive number and a negative number always equals a negative number or zero.

   a. Create an example that that supports Rachel's claim.

   b. Create an example that that shows Rachel's claim is false.

A. Supports Rachel's Claim

$\square + \square = \square$

B. Shows Rachel's Claim is False

$\square + \square = \square$

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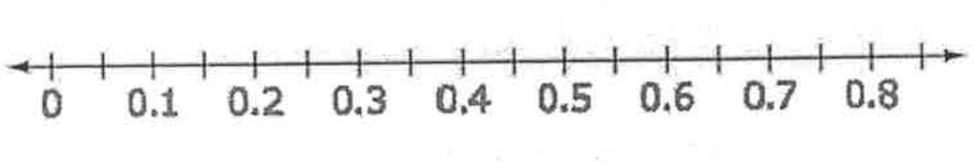
3. Graph each value appropriately in the correct position on the number line.

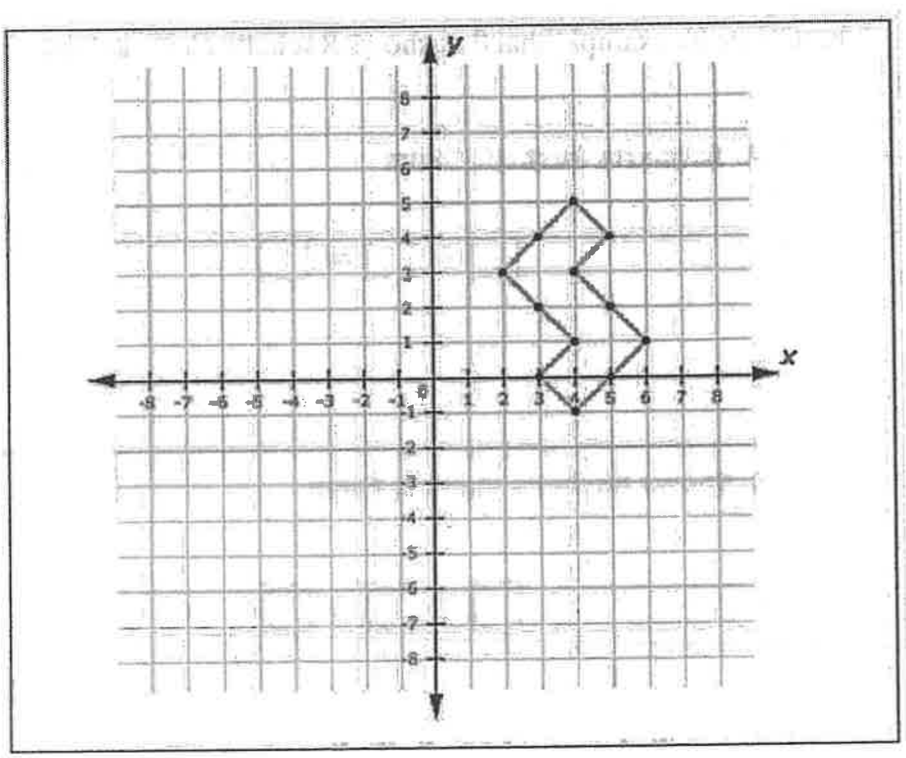


$\frac{\sqrt{4}}{5}$ $\qquad$ $\frac{\pi}{5}$ $\qquad$ $\frac{3}{10}$

4. Draw the image of the figure after the following translations.

a. A reflection over the x-axis.

b. A horizontal translation 7 units to the left.



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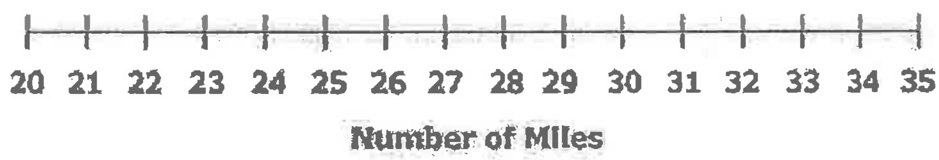
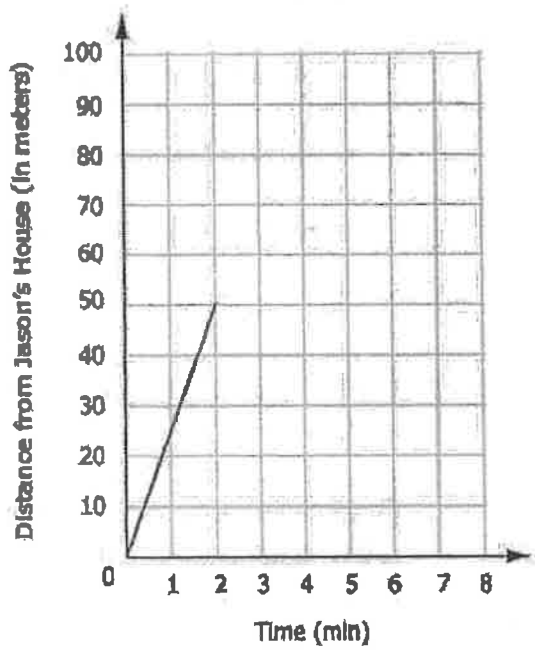
5. Justin's car can travel $77\frac{1}{2}$ miles with $3\frac{1}{10}$ gallons of gas. Kim's car can travel $99\frac{1}{5}$ miles with $3\frac{1}{5}$ gallons of gas. At these rates, how far can each car travel with one gallon of gas? Graph the number of miles for each car on the number line.



6. The school is 100 meters from Jason's house. The following describes his most recent trip:

- He walked 50 meters toward school in 2 minutes. He realized that he left a book at home.
- He turned around and walked home at the same speed.
- He spent 1 minute looking for his book.
- He walked all the way to school at twice his original speed.



Finish the graph so that it accurately represents Jason's trip.

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7. Two sides of a right triangle have lengths of $\sqrt{10}$ and $\sqrt{6}$ units. There are two possible lengths for the third side.

What is the shortest possible side length, in units?

What is the longest possible side length, in units?

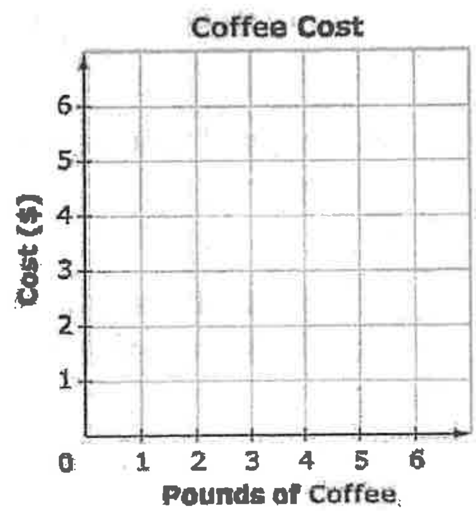
8. Kayla asked 10 students in her class whether they owned a dog or a cat or both. Write any number 0-9 to complete the table, given this information:

	Dog	No Dog	Total
Cat			
No Cat			
Total			10

- 40% of the students own a dog.
- 30% of the students own a cat.
- 10% of the students own both a cat and a dog.

9. Coffee costs $2.00 per pound at a coffee shop.

Graph a line that shows the proportional relationship between the number of pounds of coffee purchased and the total cost.



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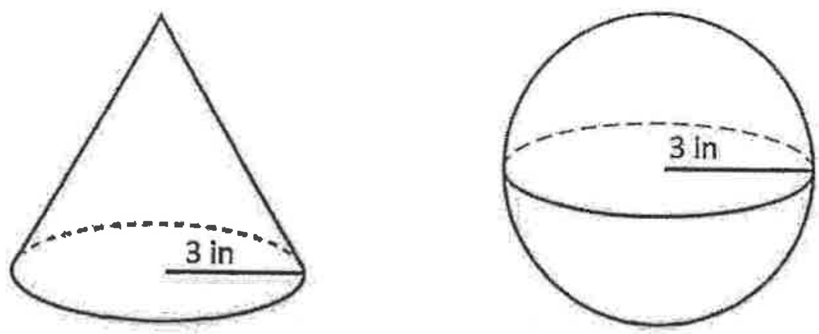
10. A sphere and a cone have the same volume. Each figure has a radius of 3 inches.

What is the height of the cone?



11. Joe solved this linear system correctly.

$$6x + 3y = 6$$
$$y = -2x + 2$$

These are the last two steps of his work.

$$6x - 6x + 6 = 6$$
$$6 = 6$$

Which statement about this linear system must be true?

a. x must equal 6.

b. y must equal 6.

c. There is no solution to this system.

d. There are infinitely many solutions to this system.

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12. Using digits 0-9, write numbers in each of the boxes to complete each equation given the number of solutions.

A. Equation with no solutions $8x - 3x + 2 - x = \square x + \square$
B. Equation with one solution $8x - 3x + 2 - x = \square x + \square$
C. Equation with infinitely many solutions $8x - 3x + 2 - x = \square x + \square$

13. Look at these numbers.

$$\sqrt{2},\ \sqrt{3},\ \sqrt{5},\ \sqrt{7}$$

Classify the numbers by ALL that apply.

Integer

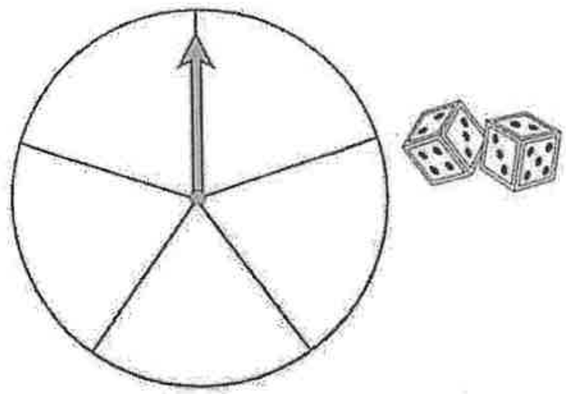
Irrational

Rational

Real

14. A game that uses a spinner and two number cubes is played at a game night. To win the game, a player must have two results:

- The spinner's arrow stops in a red section.
- The number cubes both land with an even number facing up.



The person in charge of the night wants 10% of the players to win.

Label the spinner with the colors red, green, and blue to design one that reaches the goal.

15. Kyle was given a problem to solve. The problem and his work are shown. What part of Kyle's work contains the mistake? What part of the problem should Kyle read again to fix his mistake?

A company sells baseball gloves and bats. The gloves regularly cost \$30 and the bats regularly cost \$90. The gloves are on sale for \$4 off, and the bats are on sale for 10% off. The goal is to sell \$1200 worth of bats and gloves each week. Last week, the store sold 14 gloves and 9 bats.

Did the store meet its goal?

1.	2.	3.
$\begin{array}{r} \$30 \\ -\ \$4 \\ \hline \$26 \end{array}$	$\begin{array}{r} \$90 \\ \div\ 0.9 \\ \hline \$100 \end{array}$	$\begin{array}{r} \$900 \\ +\ \$364 \\ \hline \$1264 \end{array}$
$\begin{array}{r} \$26 \\ \times\ 14 \\ \hline \$364 \end{array}$	$\begin{array}{r} \$100 \\ \times\ 9 \\ \hline \$900 \end{array}$	

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16. Solve all problems and show all work.

a. $-4t-6=22$

b. $\frac{m}{-5}+6=-4$

c. $-4r+5=-25$

d. $\frac{x}{-3}+(-7)=6$

e. $5g+(-3)=-12$

f. $\frac{y}{-2}+(-4)=8$

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17. Solve all problems and show all work.

a. $4x+8-6=2(9-2)$

b. $\frac{t}{5}-7+31=8(6-4)$

c. $9-5(4-3)=-16+\frac{x}{3}$

d. $6t-9-3t=8(7-4)$

e. $4r-7=8r+13$

f. $6y+5=4y+5$

g. $3(4+4x)=12x+12$

h. $7(1-y)=-3(y-2)$

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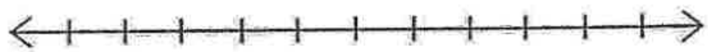
18. Solve and graph each inequality below.

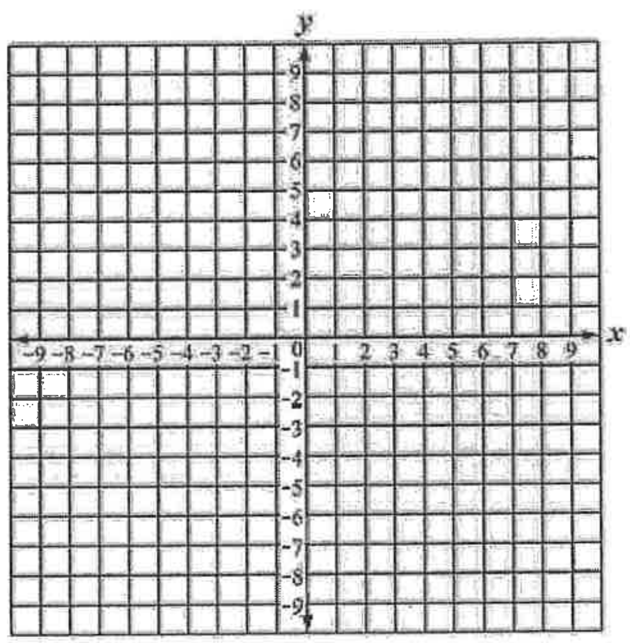
$5x + 4 < 29$

$-\frac{x}{3} - 5 > 2$



19. Solve for y and graph using the slope (rise/run) and y-intercept.

$$2y - 4x = 10$$



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20. In this task, you will be given clues about particular perfect squares and square roots. Using the clues name the perfect square.

EXAMPLE: Doubled, my value is -12, but my product is 36. What number am I?

Answer: -6

a. Doubled, my value is 18, but my product is 81. What number am I? ____

b. Doubled, my value is 22, but my product is 121. What number am I? ____

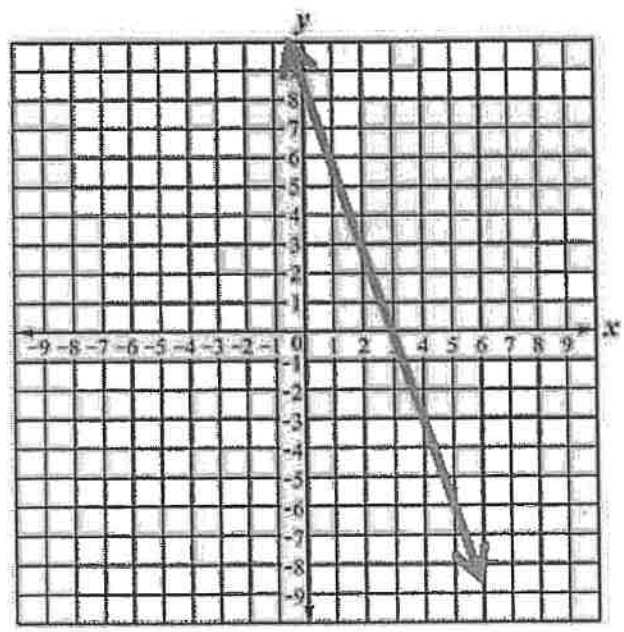
c. Doubled, my value is 16, but my product is 64. What number am I? ____

d. Doubled, my value is -24, but my product is 144. What number am I? ____

21. Using the graph at below, define the slope of the line and the y-intercept.

Slope = ____________________

y-intercept = ________________



22. Write the next three terms in the patterns below. Then write the rule.

a. -10, -7, -4, -1, ...

b. -6, -12, -24, -48, ...

c. 1, 4, 9, 16, ...

d. 729, 243, 81, 27, ...

e. 24, 19, 14, 9, ...

f. 8, -8, 8, -8, ...

g. 16, 8, 4, 2, ...

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23. Simplify each problem below according to the Laws of Exponents.

Multiplying: $a^m a^n = a^{m+n}$

Power to a power: $\left(a^m\right)^n = a^{mn}$

Dividing: $\dfrac{a^m}{a^n} = a^{m-n}$

Negative power: $a^{-n} = \dfrac{1}{a^n}$

Zero power: $a^0 = 1$

a. $(a^2b^2c) + (a^2bc) + (a^2b^2c) =$ ________________

b. $(3a^2b^4c)(6a^3b^4c) =$ ________________

c. $(5x^3y^4z)^2 =$ ________________

d. $\dfrac{(12x^7y^3)}{(6x^5y^2)} =$ ________________

e. $\dfrac{54x^2y^7}{9x^4y^3} =$ ________________

f. $\dfrac{x^4}{x^7} =$ ________________

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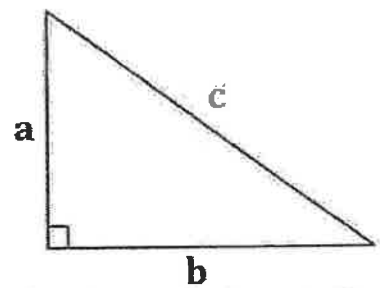
26. The Pythagorean Theorem is the formula relating the 3 sides of a right triangle. Use the formula to find the missing sides.

a. 3, 4, c

b. 5, b, 13

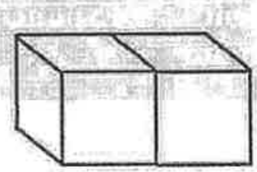
c. a, 8, 10

d. 7, 7, c



$a^2 + b^2 = c^2$
where c is the longest side (hypotenuse)

27. A company makes colored rods by joining cubes in a row and using a sticker machine to place "smiley" stickers on the rods. The machine places exactly 1 sticker on each exposed face of each cube. Every exposed face of each cube has to have a sticker; this rod of length 2 would need 10 stickers.



a. How many stickers would you need for rods of length 1-10? Explain how you determined these values.

b. How many stickers would you need for a rod of length 20? Of length 56? Of length 137? Explain how you determined these values.

c. Write a rule that would allow you to find the number of stickers needed for a rod of any length. Explain your rule.

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28. For each equation, determine if the equation is **always** true, **never** true or **sometimes** true. If the equation is **sometimes** true, determine the numbers that make it true.

a. $6y + 5 = 4y + 5$

b. $5x + 8 = 8 + 5x$

c. $7p - 8 = 7p + 6$

d. $x^2 = 100$

e. $-2(6 - 10n) = 10(2n - 6)$

f. $7(1 - y) = -3(y - 2)$

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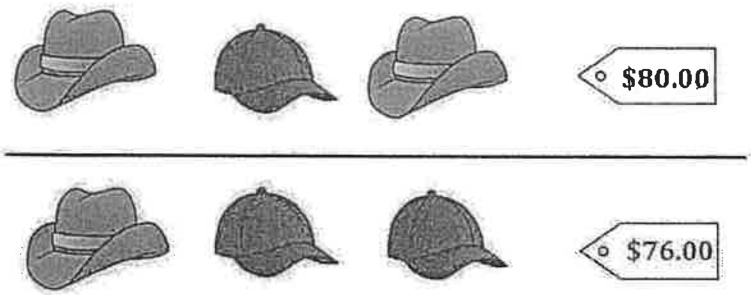
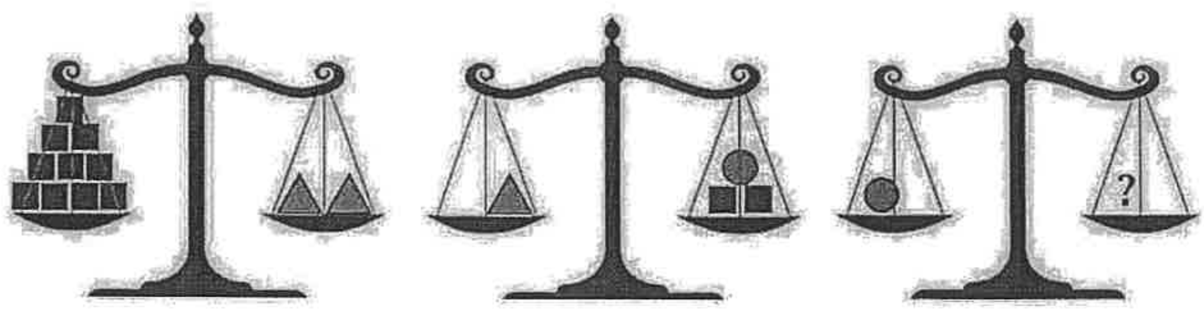
30. How much does one baseball cap cost? How much is one cowboy hat?



31. How many squares are needed to make the third scale balance?



32. A square, with side length s, has an area of 324 square centimeters. This equation shows the area of the square. What is the side length of the square in centimeters?

$$s^2 = 324$$

33. Segment FG begins at point F (-2, 4) and ends at point G (-2, -3). The segment is translated by <x – 3, y + 2> and then reflected across the y-axis to form segment $F'G'$. How long is segment $F'G'$.

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