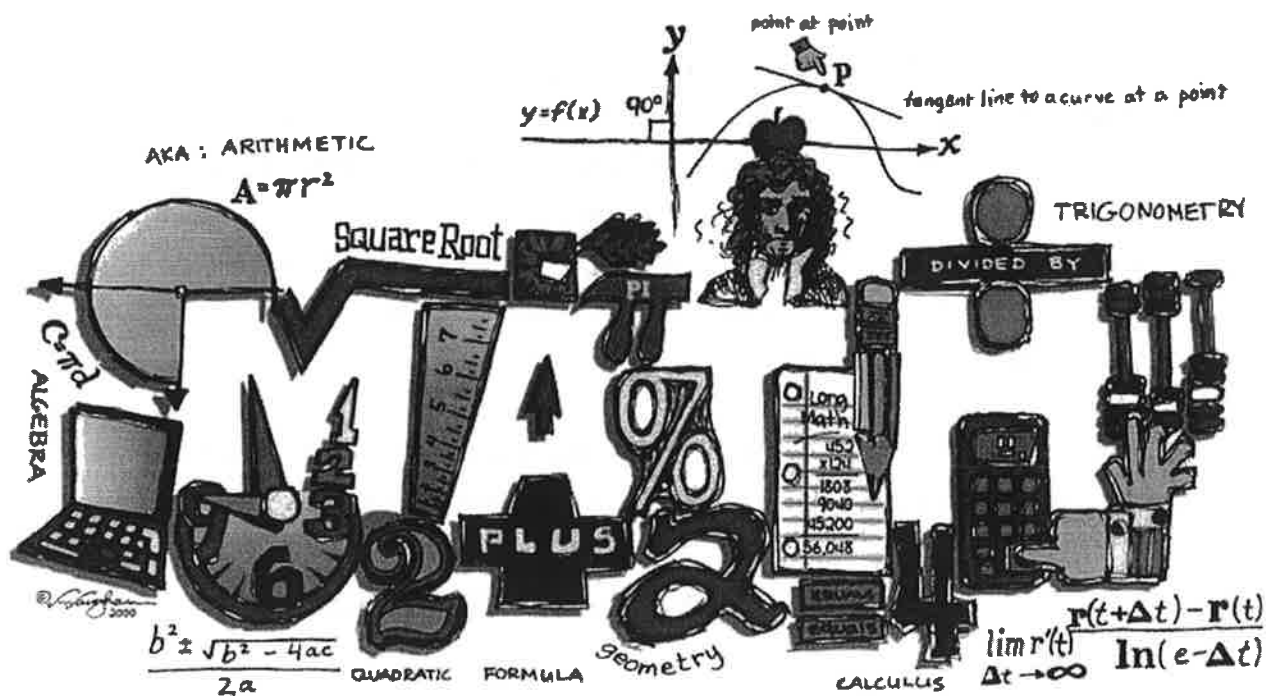


ALGEBRA

Summer Assignment

2019-2020



Name: _____

Dear Student and Parent/Guardian -

The 8th grade Math department here at KJH welcomes you to Algebra I! We are excited that you've worked hard to make it to this class where you can receive high school credit before entering high school! In order to do that, we want you to be prepared for not only the beginning of the school year, but eventually for the AIR test as well. This packet is designed to help you reach those goals by reviewing necessary skills.

Be sure to follow the information below when completing this packet:

- The packet is due on August 16, 2019 (1st Friday of school year)
- Every problem must be completed. None left blank.
- This packet will be one of the first grades you will have during the 1st quarter.
- There will be a mini quiz grade over the packet during the 1st two weeks of school. These topics also tie in with the first few units of Algebra I.
- Work must be show to receive credit - no work, no points. Show the work on the actual packet pages (please try to refrain from adding additional pages)
- All topics covered in the packet should be completed without the aid of a calculator. Please try to follow this request.
- Do not wait until the last minute to complete the packet. Gradually complete the pages over the course of your time off to reduce stress and anxiety with a new school year beginning!

We hope that you have an enjoyable summer and return to school ready to be successful in Algebra I! Below are some helpful websites that you can check out for additional assistance/help:

www.glencoe.com www.regentsprep.com www.khanacademy.org

www.purplemath.com/modules

Sincerely,

Mr. Poggi (8 White)

Mrs. Jackson (8 Red)

Mr. Bohardt (8 Blue)

Order of Operations

Objective: To evaluate expressions using the order of operations.

Example 1

Simplify $9 \div 3 + 4 \cdot 7 - 20 \div 5$

Solution	$3 + 4 \cdot 7 - 20 \div 5$	Divide 9 by 3.
	$3 + 28 - 20 \div 5$	Multiply 4 and 7.
	$3 + 28 - 4$	Divide 20 by 5.
	$31 - 4$	Add 3 and 28.
	27	Subtract 4 from 31.

Reminder:

Please Excuse
My
Dear Aunt Sally

Example 2

Simplify $8 - [(3 \cdot 4) - 5]$.

Solution	$8 - [12 - 5]$	Simplify the innermost parentheses first.
	$8 - 7$	Then the [] grouping.
	1	Subtract.

Find the value of each expression. Show ALL work.

1. $8 + [(16 - 6) \div 2]$

2. $16 - 3[9 - 2(5 - 3)]$

3. $[(4 + 8) \div 6] \cdot 3$

4. $(8 + 16) \div (12 - 9)$

5. $\frac{30}{3(5 - 3)}$

6. $14 \cdot [(15 - 7) \div 4]$

Evaluating Expressions

Objective: To evaluate an algebraic expression.

Example 1

Evaluate the expression $c+b-23$ if $c=25$ and $b=16$.

Solution

$$\begin{aligned}c+b-23 &= 25+16-23 && \text{Substitute the given values for the variables.} \\ &= 41-23 && \text{Simplify by adding 25 and 16.} \\ &= 18 && \text{Subtract 23 from 41.}\end{aligned}$$

Example 2

Evaluate the expression $2x+(3y-z)+7$ if $x=5$, $y=2$, and $z=4$.

Solution

$$\begin{aligned}2x+(3y-z)+7 &= 2\cdot 5+(3\cdot 2-4)+7 && \text{Substitute the given values.} \\ &= 2\cdot 5+(6-4)+7 && \text{Simplify by multiplying inside parentheses first.} \\ &= 10+2+7 && \text{Multiply 2 times 5 and subtract 4 from 6.} \\ &= 19 && \text{Add.}\end{aligned}$$

Evaluate each expression if $x=2$ and $y=-3$. Show ALL work.

1. $2x-y$

2. $3y-(2-x)$

3. $(7+x)(y-1)$

Evaluate each expression if $r=6$ and $t=8$. Show ALL work.

4. $(r-4)+2t$

5. $[10-(r\div 3)]+2t$

6. $[3\cdot(t+1)]-r$

Combining Like Terms

Objective: To simplify an algebraic expression by combining like terms.

Example 1

Simplify the expression $3x + 5 - 9 - x$.

Solution

$3x - x + 5 - 9$ Rewrite expression so that like terms are together.

$2x - 4$ Combine the like terms.

Example 2

Simplify the expression $6x - 15 - 4x - (-8)$.

Solution

$6x - 4x - 15 - (-8)$ Rewrite expression so that like terms are together.

$2x - 7$ Combine $6x - 4x$ and $-15 - (-8)$.

Simplify each expression. Show ALL work.

1. $7x + 5 + 2x$

2. $6 + 9x - 3$

3. $4y - 7y + 6$

4. $-8m + 3 + 10 + 3m$

5. $-7w - 6k + 4w$

6. $-11g + 8h - 3g - 7h$

7. $-14b + 7y - 5b - 10y$

8. $6x - 15 - 4x - (-8)$

9. $-2m + 9 - 4m - 13$

Distributive Property

Objective: To simplify an algebraic expression by using the distributive property

Example 1

Simplify the expression $2(x+3)$.

Solution

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

Distribute the 2 by multiplying it by the x and 3.

Example 2

Simplify the expression $3(2x+y-1)$.

Solution

$$3(2x+y-1)$$

Distribute the 3 by multiplying it by $2x$, y , and -1 .

Simplify each expression. Show ALL work.

1. $2(x+4)$

2. $-3(x+5)$

3. $2(3x-6)$

4. $8(5-4x)$

5. $-7(1+4x)$

6. $5(3x-10)$

7. $-4(x+y-8)$

8. $2(-x+2y-11)$

9. $\frac{1}{2}(x+4)$

Solving Two Step Equations

Objective: To solve equations using two transformations.

Example 1

a. Solve for x .

$$2x + 8 = 14$$

$$2x + 8 - 8 = 14 - 8 \quad \text{Subtract 8 from both sides}$$

$$2x = 6$$

$$\frac{2x}{2} = \frac{6}{2} \quad \text{Divide by 2 on both sides}$$

Solve for x . $x = 3$ Circle your final answer. Show ALL work.

b. Solve for x .

$$\frac{x}{5} - 3 = -6$$

$$\frac{x}{5} - 3 + 3 = -6 + 3 \quad \text{Add 3 to both sides}$$

$$\frac{x}{5} = -3$$

$$5 \cdot \frac{x}{5} = -3 \cdot 5 \quad \text{Multiply by 5 on both sides}$$

$$x = -15$$

1. $2x + 4 = 12$

2. $-3x + 8 = -4$

3. $15 = -x - 7$

4. $5x - 4 = 21$

5. $-8 = \frac{x}{2} + 3$

6. $\frac{x}{5} - 3 = 10$

7. $\frac{x}{4} + 5 = 16$

8. $6x + 8 = 5$

9. $\frac{2}{3}x - 1 = 11$

Two Step Inequalities & Graphing

TWO STEP INEQUALITIES AND GRAPHING

Objective: To solve an inequality and graph the solution on a number line.

Example 1

Solve for $3x+6 \leq 15$ and graph the solution on a number line.

Solution

$$\begin{aligned} 3x+6 &\leq 15 \\ -6 &-6 \\ \frac{3x}{3} &\leq \frac{9}{3} \\ x &\leq 3 \end{aligned}$$

Subtract 6 from both sides.

Divide both sides by 3.

Plot a solid dot on 3 and shade everything less than 3 or to the left of 3.



Reminder:

$\leq \geq$ use a solid dot.

$< >$ use an open dot.

Example 2

Solve for $-3x-2 < 10$ and graph the solution on a number line.

Solution

$$\begin{aligned} -3x-2 &< 10 \\ +2 &+2 \\ -3x &< 12 \\ \frac{-3x}{-3} &> \frac{12}{-3} \\ x &> -4 \end{aligned}$$

Add 2 to both sides.

Divide both sides by 3.

When you multiply or divide by a negative you must reverse the inequality symbol

Plot an open dot on -4 and shade everything greater than -4 or to the right of -4.



Solve for x and graph the solution on the number line. Show ALL work.

1. $\frac{x}{4} - 3 \leq 2$

2. $2 - 2x < -2$

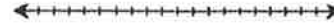
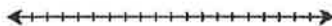
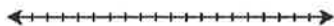
3. $2x + 17 > 25$



4. $4 < 3x - 2$

5. $-5 - x \geq -3$

6. $-4 > \frac{x}{-3} + 1$



Pythagorean Theorem

Objective: To find the missing side in a right triangle using Pythagorean Theorem

Steps: (Solving for a missing side in a right triangle)

1. Identify the legs and hypotenuse of the right triangle
2. Substitute the values into the formula $a^2 + b^2 = c^2$
3. Solve the equation for the missing side.

Example: (Finding a leg)

$$a^2 + 24^2 = 26^2$$

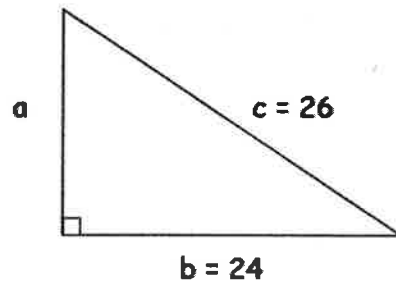
$$a^2 + 576 = 676$$

$$a^2 = 676 - 576$$

$$a^2 = 100$$

$$a = \sqrt{100}$$

$$a = 10$$



Example: (Finding the hypotenuse)

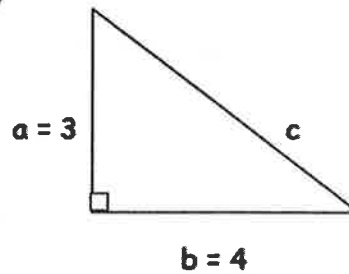
$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

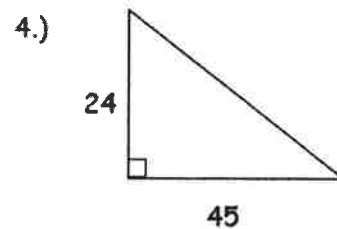
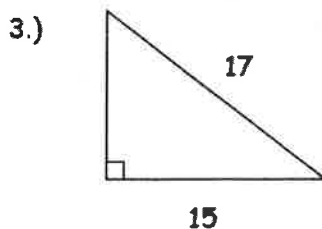
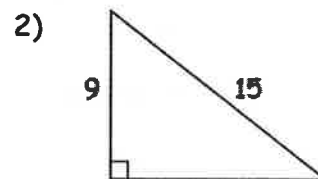
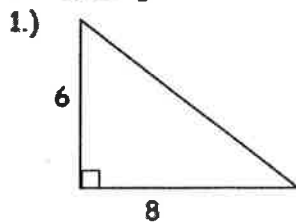
$$25 = c^2$$

$$\sqrt{25} = c$$

$$5 = c$$



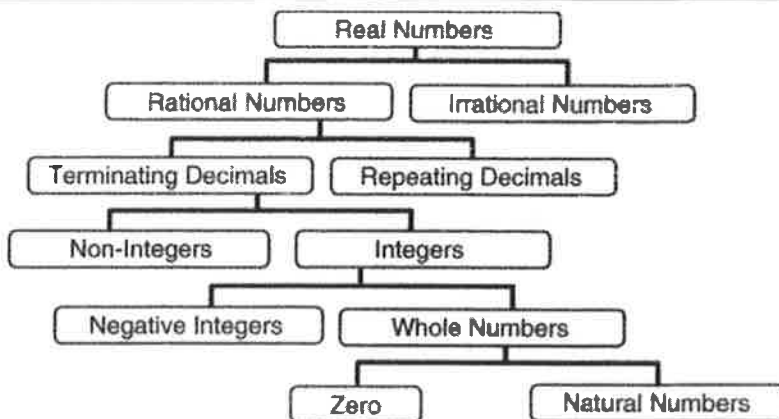
Find the missing side in each of the following right triangles.



Real Number System

Objective: To understand and be able to classify numbers in the real number system.

This flowchart shows the subsets of the real numbers and how they are related. To identify the classifications of a real number, start at the top and work your way down.



Example:

Write all of the classifications that apply to the real number -4 .

-4 can be shown on a number line. It is real.

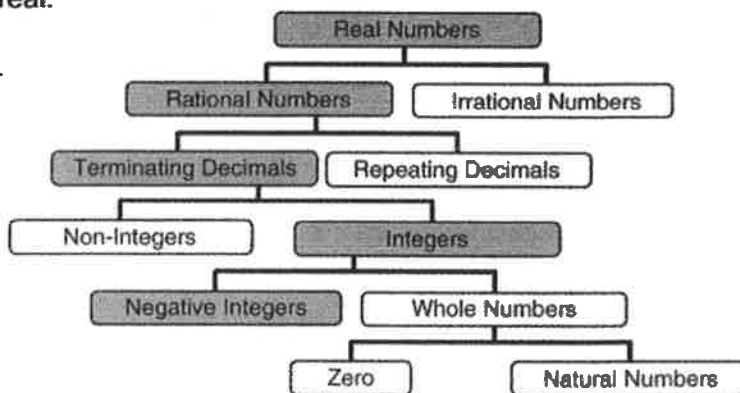
-4 can be written as $-\frac{4}{1}$ so it is rational.

Its decimal representation terminates: $-4 = -4.0$.

-4 is an integer.

-4 is a negative integer. Stop.
There are no more subsets in the chart below negative integers.

-4 : real number, rational number, terminating decimal, integer



Write all of the classifications that apply to each real number:

1. -27 : _____
2. $\frac{1}{6}$: _____
3. $\sqrt{33}$: _____
4. -6.8 : _____
5. $\sqrt{400}$: _____