Hayfield Secondary School

Summer Math Guide

Math 7 Honors

Directions:

Complete each lesson by watching the video lesson and filling in the notes and examples.

After each video, complete ALL "Try it on your own" problems.

This packet will be collected by your Math teacher at the beginning of the year.

YouTube videos can be found by searching for "Jennifer Mirzayan" and locating the Summer Math 7 HN Playlist.

Lesson 1: Compare and Order Rational Numbers

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/FlNSOt5cvpc

Comparing Fractions, Decimals, and Percents

When comparing fractions, decimals and percents-

1) Convert all numbers to the same format.

2) Use the appropriate symbol to compare. (<, >, =)

Example: Compare the following numbers using <, >, and =.

a) 45% _____ 45.45

b) 0.27_____$\frac{1}{4}$

c) 33.3%_____$\frac{1}{3}$

Example:

Which number correctly completes the statement below?

$$\frac{1}{4} > \qquad > 1.45$$

a) $2\frac{1}{3}$ b) 0.15 c) $\frac{1}{5}$ d) 100%

Try it on your own!

Which number correctly compares the statement below?

$$\frac{1}{3} < \qquad < 60\%$$

a) $\frac{1}{2}$ b) 30% c) 0.125 d) $\frac{1}{5}$

Ordering Fractions, Decimals, and Percents

Step 1:

Step 2:

**Remember, _____

_____.

Example:

Put the following in order from least to greatest.

$$40\%, -\frac{5}{9}, 0.6, 50\%, \quad \frac{4}{5}$$

_____, _____, _____, _____, _____

Least → → → → → → → → → Greatest

Try it on your own!

Put the following in order from least to greatest.

$$\frac{7}{10}, \frac{3}{4}, \frac{7}{9}, \frac{2}{3}$$

Put the following in order from greatest to least.

$$-\frac{2}{3}, -0.7, -0.61, -\frac{13}{20}$$

Put the following in order from least to greatest.

$$0.082, 8\%, \frac{9}{10}, 0.3$$

Lesson 2: Integer Operations

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/zUc9tbOe2kY

Adding Integers

Positive + Positive=	Positive + Negative=	Negative + Negative=
Example: a) $4 + 8 =$ b) $2 + 6 =$	Example: a) $14 + (-3) =$ b) $-8 + 5 =$	Example: a) $-2 + -7 =$ b) $-9 + -3 =$

Try it on your own!

A) $-5 + 10$

B) $5 + 3$

C) $3 + (-8)$

D) $0 + 13$

E) $-15 + (-2)$

F) $-1 + 5$

G) $9 + (-7)$

H) $-4 + (-5)$

I) $3 + 5 + 4$

J) $-7 + (-3) + (-4)$

K) $6 + (-8) + 4$

L) $-10 + (-3) + 13$

Subtracting Integers

Rules

Keep	Change	Change
Then **FOLLOW THE RULES OF ADDITION!**		

Example:

a) $7 - 9$

b) $-2 - 1$

c) $-8 - (-3)$

Try it on your own!

d) $5 - (-2)$

e) $-2 - (-2)$

d) $0 - 7$

Lesson 3: Proportional Reasoning

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/RGlM9sDvBZg

Proportions

A proportion is _____

_____.

The cross products in a proportion are _____.

To solve a proportion:

1)

2)

Example:

$$\frac{x}{3} = \frac{24}{9} \qquad \frac{4}{y} = \frac{6}{9}$$

Try it on your own!

a) $\frac{6}{21} = \frac{10}{p}$ **b)** $\frac{8}{y} = \frac{2}{18}$ **c)** $\frac{h}{15} = \frac{16}{10}$

To use a proportion to solve a word problem:

1)

2)

a)

b)

c)

3)

4)

Example:

If $64\ feet$ of rope weighs 20 pounds, how much will $80\ feet$ of rope weigh?

Try it on your own!

a) If 2 liters of soda cost $3.98, how much do 5 liters of soda cost?

b) Jamie can type 243 words in 3 minutes. How many words can she type in 10 minutes?

c) If 6 boxes hold 72 Mr. Seidel bobbleheads, how many boxes are necessary to hold 132 Mr. Seidel bobbleheads?

Lesson 4: Slope

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/yPxwU3yEQag

Slope

Slope is a ratio that describes the tilt (slant) of a line.

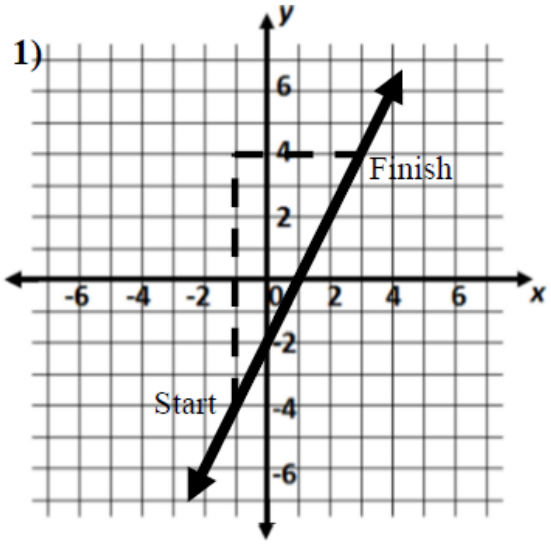
$$\frac{the\ change\ in\ y\ coordinates}{the\ change\ in\ x\ coordinates}\ OR\ \frac{(y_2 - y_1)}{(x_2 - x_1)}\ OR\ \frac{rise}{run}$$

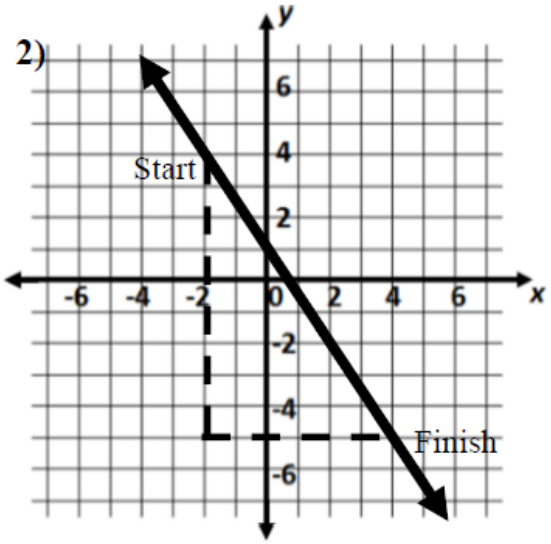
To find the slope of a line:

1) Count the change in y coordinates. (Up and down movement)

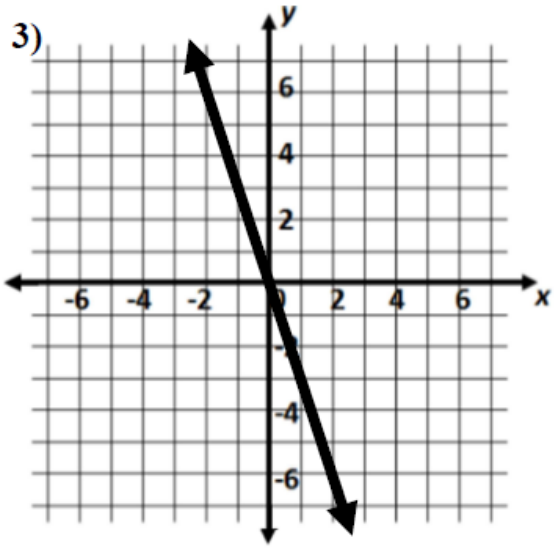
2) Count the change in x coordinates (Left and right movement)

Example:

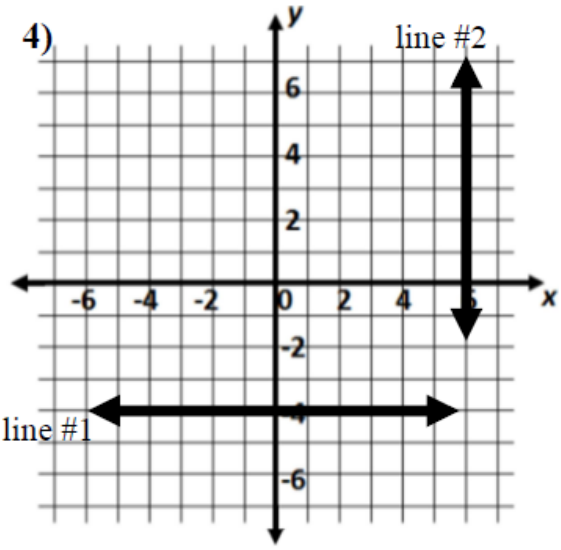




Try it on your own!



slope =



(line #1) slope =
(line #2) slope =

To find the slope between two points algebraically:

1) Substitute the x and y coordinates into the formula.

2) Simplify the ratio.

Example:

a) Given $(3, 5) and\ (1, 11)$

b) Given $(-3, -2) and\ (1, -12)$

Try it on your own!

a) Given $(7, -2) and\ (2, 18)$

b) Given $(-6, 3) and\ (-6, 10)$

Lesson 5: Equations and Inequalities

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/643Zo1W1Wig

Equations

An equation is a mathematical sentence with an _____.

Important Rules for Solving Equations:

1) Your goal is to get the variable alone by itself on one side of the equation.

2) You must use inverse operations to isolate the variable.

3) Whatever you do to one side of an equation, you must do to the other side of the equation.

Example:

a) $x + 4 = 6$ **b)** $y - 5 = 12$ **c)** $2p = 18$ **d)** $\frac{t}{4} = 4$

Try it on your own!

a) $x + 11 = 3$ **b)** $b - 12 = 49$ **c)** $4x = 80$ **d)** $\frac{z}{14} = 2$

Whenever you see a variable, it is understood to have a 1 in front of it.

Example: $x = 1x$

Therefore, whenever you see a negative sign in front of a number or variable, it is understood to have a negative 1 in front of it.

Example: $-x = -1x$

To solve a multi-step equation:

1) Perform any distributive property in the equation.

2) Combine any like terms in the equation.

3) Now you should have a two step equation. Solve by undoing addition and subtraction first, then multiplication and division.

Example:

a) $2(x+5) = -11$

b) $-3(y+10) = -9$

Try it on your own!

a) $-13 = 5 + 4x - 6x$

b) $\frac{1}{2}(4x - 10) = -7$

Inequalities

An inequality compares two _____ and uses $<, >, \leq, or \ \geq$.

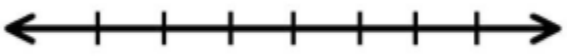
They are solved just like equations, using inverse operations.

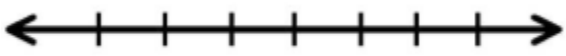
When graphing, use an open circle when the graph does NOT include the point ($<, >$). Use a closed circle when the graph includes the point ($\leq, \geq$).

Example:

a) $x - 4 < 1$

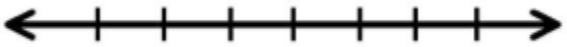
b) $8 \geq d - 2$



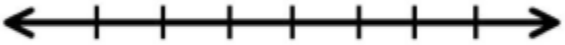


Try it on your own!

a) $\frac{p}{9} \geq -3$



b) $-92 < 23d$



If you multiply or divide by a negative, you must flips the sign!

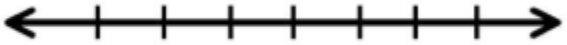
Example:

a) $-5x + 12 < -18$

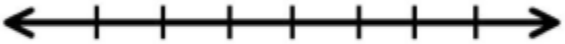
b) $5 - 4b < 21$

Try it on your own! Solve and graph.

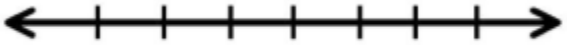
a) $5 < 7 - 2t$



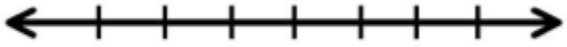
b) $\frac{n}{7} + 2 \geq 2$



c) $13 > \frac{y}{-3} + 5$



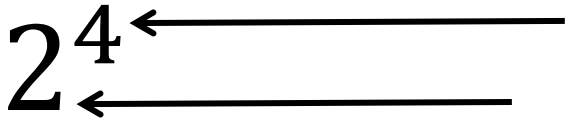
d) $-7 \leq -c - 29$



Lesson 6: Negative Exponents

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/bD68ljLepwM



Exponent	Definition:	Example:

Exponential Form	Expanded Form	Standard Form
2^4		
2^3		
2^2		
2^1		
2^0		
2^{-1}		
2^{-2}		
2^{-3}		
2^{-4}		

When the exponent is *NEGATIVE*, move the exponential form to the denominator and drop the negative.

Negative Exponents	Definition:	Example:

Changing a negative exponent from **exponential form to a fraction**…

Step 1:

Step 2:

Step 3:

10^{-5}

Try it on your own!

a) 10^{-3} b) 10^{-6}

Changing a negative exponent from **exponential form to a decimal**…

Step 1:

Step 2:

10^{-5}

Try it on your own!

a) 10^{-3} b) 10^{-6}

Try it on your own! Change each number into exponential form.

a) 0.001 b) $\frac{1}{10^4}$

Try it on your own!

5) 10^{-2} 6) 10^{7}

Lesson 7: Scientific Notation

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/TcHLD9LG2wM

Ordering Numbers in Scientific Notation

Method 1: Change all of the numbers to _____ _____.

First, change all of the numbers to _____ form. REMEMBER, the factor must be greater than or equal to _____ but less than _____.

Then, _____ up all of the numbers!

Example 19: Put the following numbers in order from least to greatest.

$$7.8 \times 10^6, 5.1 \times 10^4, 1.25 \times 10^5, 4.09 \times 10^4$$

7.8×10^6	
5.1×10^4	
1.25×10^5	
4.09×10^4	

_____,_____, _____, _____

Least **Greatest**

Method 2: Compare the _____ and the _____.

First, look at the _____ of each number. To put them in order, organize them based on the _____.

Example: Put the following numbers in order from least to greatest.

$$7.8 \times 10^6, 5.1 \times 10^3, 1.25 \times 10^5, 4.09 \times 10^4$$

_____,_____, _____, _____

Least **Greatest**

But what if the numbers all have the same exponent?

Example: Put the following numbers in order from least to greatest.

$$7.8 \times 10^6, 6 \times 10^6, 9.6 \times 10^6, 4.1 \times 10^6$$

First, make sure all of the _____ are the same. If they are, then we can ignore the exponents and simply look at the _____. Put the numbers in order based on the size of the _____.

_____, _____, _____, _____

Least **Greatest**

Try it on your own!

a) Write the following in order from greatest to least.

$$3.4 \times 10^5, 3.41 \times 10^5, 3.14 \times 10^5$$

b) Write the following in order from greatest to least.

$$4.09 \times 10^{-2}, 5.928 \times 10^{-3}, 6.1 \times 10^{-3}$$

c) Write the following in order from least to greatest.

$$7.003 \times 10^4, 7.03 \times 10^4, 7.3 \times 10^4$$

d) Write the following in order from least to greatest.

$$6.9 \times 10^{-3}, 6.09 \times 10^{-5}, 6.9 \times 10^{-4}$$

Lesson 8: Square Roots

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/ph9j3r-Asbg

Square Roots

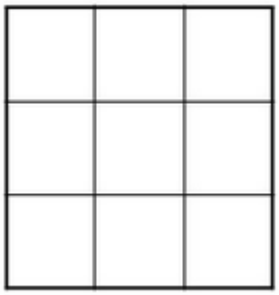
Square	Definition:	Example:
Square Root	Definition:	Example:

Fill in the table with the perfect square.

Number	Perfect Square		Number	Perfect Square		Number	Perfect Square		Number	Perfect Square
1			6			11			16	
2			7			12			17	
3			8			13			18	
4			9			14			19	
5			10			15			20	

Try it on your own! Find the square root given the square.

a)

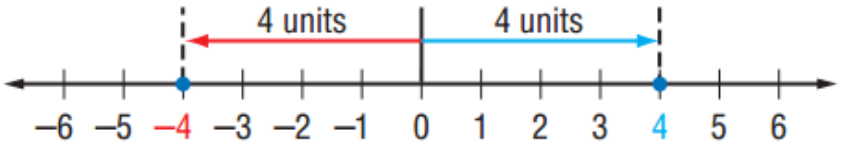


b)

Lesson 9: Absolute Value

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/QEK7jIUYQB0



Absolute Value	Definition:	Example:

→ Since distance cannot be _____, the absolute value of a number is always_____.

Example: Evaluate.

a) $|8|$ **b)** $|23|$

Try it on your own!

c) $|-9|$ **d)** $|-13|$

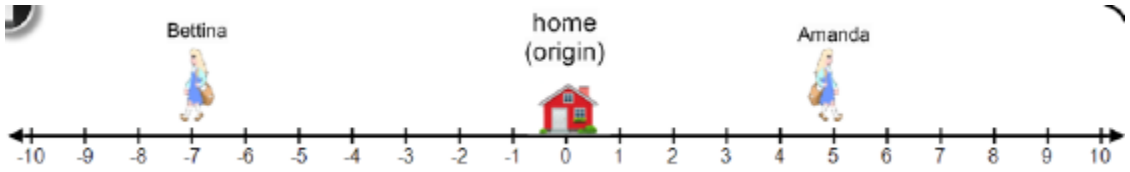
Example: Replace each blank with < , > , or = to make a true sentence.

a) -3 ____ $|-6|$ **b)** $|-3|$____$|-6|$

Try it your own!

c) 6____$|-6|$ **d)** -8 ____$|-8|$ **e)** $|10|$____$|-10|$

Example:



a) How far is Amanda from home?

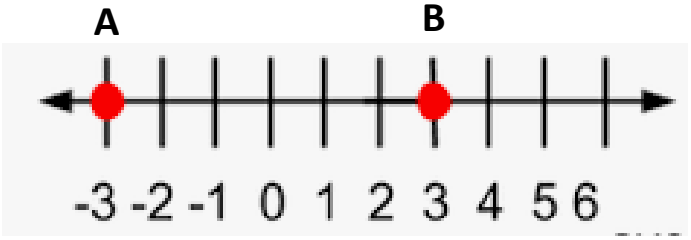
b) How far is Bettina from home?

c) Who is farther away from home?

d) How can we represent their distance using absolute value?

Example:

Using the number line give below, represent the distance between points A and B using absolute value.



Try it on your own!

Which of the following represents the distance between points x and y on the number line?

a) $|-4+2|$ **b)** $|2-4|$ **c)** $|-4-2|$ **d)** $|2+(-4)|$

Lesson 10: Order of Operations

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/3HZuOSBOnQM

Order of Operations

If your class were given the following problem to simplify, would everyone get the same answer?

$$30 - 12 \div 2 + 4 \cdot 3 - 5$$

Some possible answers may be $34, 16, 4, or\ 31$.

We can arrive at a variety of answers because there is confusion as to which operations should be done in _____ _____. Sometimes symbols of inclusion (parentheses or brackets) are used to group the numbers together in a specific arrangement to help. To avoid confusion and to assure that we all get the same answer, we use the order of operations shown below:

Order of Operations (GEMDAS is a special acronym to help you remember)

1. **Simplify expressions inside _____. (Ex:_____, _____, _____, _____, or _____)**
2. **Simplify or evaluate any terms raised to _____. (_____)**
3. **Do multiplication and division operations in order as you come to them from _____ to _____.**
4. **Finally, do all addition and subtraction operations in order as you come to them from _____ to _____.**

Example:

$$30 - 12 \div 2 + 4 \cdot 3 - 5$$

Example:

$$(8 + 4) \div (10 - 6) + 52$$

Evaluate each expression.

1) $\frac{12}{4} + 2$

2) $6^2 \div (3 + 9) + 2(5 + 3)$

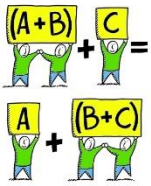
3) $\frac{6(2+5)}{3(7)}$

Lesson 11: Properties

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/3tRChgu27Fs

Properties of Addition and Multiplication

Property	Visual Representation	Definition	Addition Example	Multiplication Example
Commutative				
Associative				

Property	Visual Representation	Definition	Examples
Distributive			
Identity Property of Addition	5+0= 5 		
Identity Property of Multiplication	5 x 1= 5 		

Inverse Property of Addition	$-5+5=0$		
Inverse Property of Multiplication	$8\times\frac{1}{8}=1$		

Try it on your own!

Match the property with an example and describe why you chose that property.

A. Commutative Property of Addition	F. Identity Property of Addition
B. Commutative Property of Multiplication	G. Identity Property of Multiplication
C. Associative Property of Addition	H. Inverse Property of Addition
D. Associative Property of Multiplication	I. Inverse Property of Multiplication
E. Distributive Property	J. Multiplicative Property of Zero

	Example	Property	Why…?
1)	$7+4=4+7$		
2)	$(3\bullet 8)\bullet 9=3\bullet(8\bullet 9)$		
3)	$1\bullet 5=5$		
4)	$8+(2+5)=(8+2)+5$		
5)	$(-2)+2=0$		
6)	$0+4=4$		
7)	$3(6+4)=3(6)+3(4)$		
8)	$\frac{2}{3}\bullet\frac{3}{2}=1$		
9)	$5\bullet 8=8\bullet 5$		
10	$6\bullet\frac{1}{6}=1$		

Lesson 12: Expressions

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/Q3zrYxNxHxw

When addition or subtraction signs separate an algebraic expression into parts, each part is a _____. The numerical part of a term that contains a variable is called the _____ of the variable.

$$\boldsymbol{3x + 7 + x + 2}$$

_____are terms that contain the same variable, such as $2n$ and $5n$ or $6xy$ and $4xy$. A term without a variable is called a _____.

$$\boldsymbol{5y + 3 + 2y}$$

Example: Identify the terms, like terms, coefficients, and constants in the expressions.

a) $3x + 4y + 4x$

b) $5x + 3 + 7x + 4$

Try it on your own!

a) $6x - 2y + x - 5$

b) $3n + 5m - 6m + 2$

Simplifying Expressions

An algebraic expression is in _____ if it has no like terms and no parentheses. When you use the Distributive property to combine like terms, you are simplifying the expression.

Example: Simplify each expression

a) $4x + 6 + 2x$

b) $4(q + 8p) + p$

Try it on your own!

a) $6y - 3(x - 2y)$

b) $5n + 2 - n - 6$

Example:

You have some money in a savings account. Your sister has $25 more than you have in her account. Write an expression in simplest form that represents the total amount of money in both accounts.

Try it on your own!

Michael and Abby both collect stamps. Michael has 16 more stamps in his collections than Abby. Write an expression in simplest form that represents that total number of stamps in both collections.

Lesson 13: The Coordinate Plane

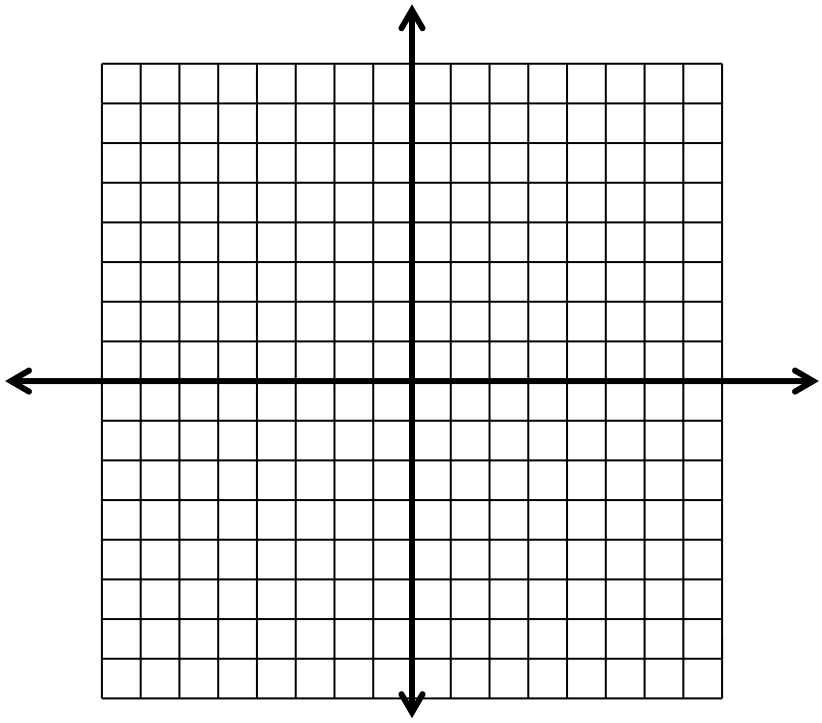
Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

https://youtu.be/uK2lSASaAX0

The Coordinate Plane and Ordered Pairs

Label the grid below

- ☐ Quadrant I
- ☐ Quadrant II
- ☐ Quadrant III
- ☐ Quadrant IV
- ☐ x-axis
- ☐ y-axis
- ☐ Origin



Ordered Pair	Definition:	Example:

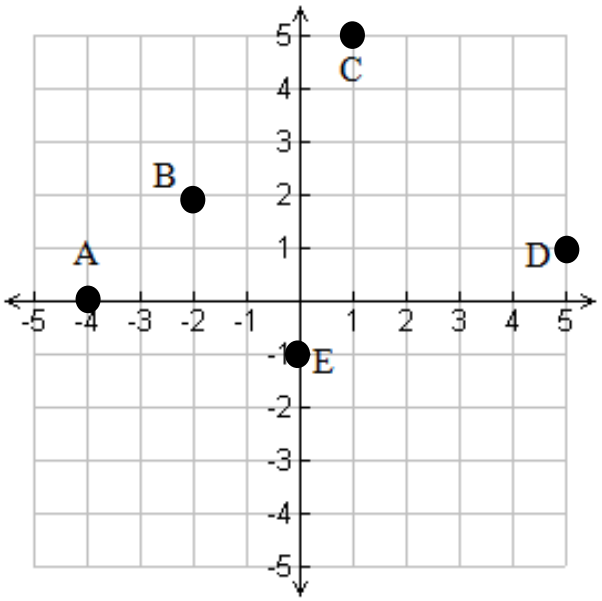
How to Plot an Ordered Pair:

Step 1:

Step 2:

Step 3:

Example: Write the coordinates of each point that is marked on the graph below. (Don't forget when you write coordinates they need to be in parenthesis and have a comma in between the two numbers!) THEN, identify the quadrant or axis of each point.



A _____ quadrant or axis: _____

B_____ quadrant or axis: _____

C _____ quadrant or axis: _____

D_____ quadrant or axis: _____

E _____ quadrant or axis: _____

Try it on your own!

Plot and label the following points on the graph.

F (2, -3)

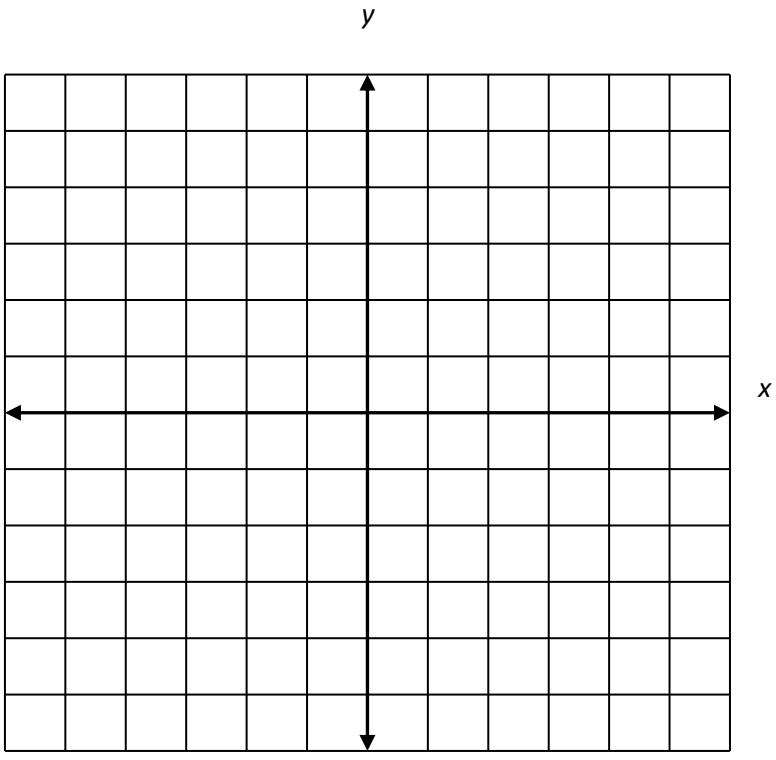
G (-4, 4)

H (0, 2)

I (2, 0)

J (-4, -4)

K (4, -4)



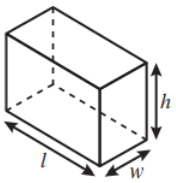
Lesson 14: Volume and Surface Area

Directions: Use the link below to watch the video and complete the notes. Once completed, go through the notes and complete ALL of the "Try on your own" problems.

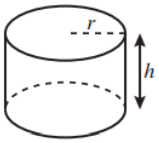
https://youtu.be/RI76Efz9lkk

Surface Area	Definition:	Key Words:

Formulas:



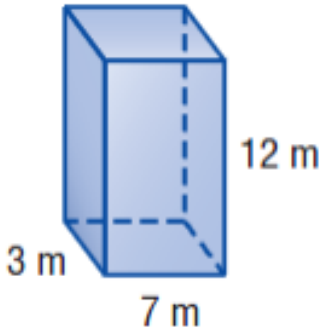
$SA = 2lw + 2lh + 2wh$



$SA = 2\pi r^2 + 2\pi rh$

Surface area is always _____.

Example: Find the surface area of the rectangular prism. Round your answer to the nearest tenth, if necessary.



Try it on your own!

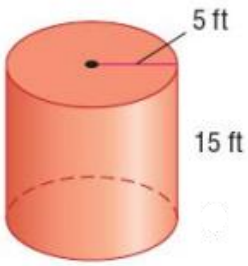
Approximately how much cardboard is required to make the shoebox below?

Try it on your own!

Carl is painting a rectangular prism-shaped box. The box is 12 inches long, 8 in wide, and 2 in high. How many inches will Carl need to paint to cover the entire box?

When given a diameter, you must _____ to change it into a radius BEFORE following the _____.

Example : Find the surface area of the cylinder below. Use 3.14 for π. Round your answer to the nearest tenth.

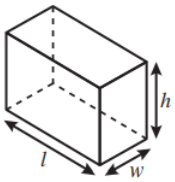


Try it on your own!

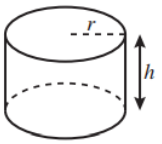
The Campbell Soup Company is making a new can. The height of the can is 11 cm and has a diameter of 4 cm. How much aluminum will they need to make each soup container?

Volume	Definition:	Key Words:

Formulas:



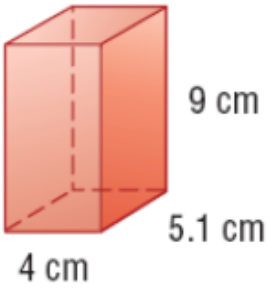
$V = lwh$



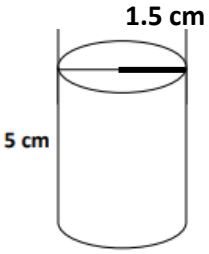
$V = \pi r^2 h$

Volume is always _____.

Example: Find the volume of the rectangular prism. Round your answer to the nearest tenth, if necessary.



Example: Find the volume of the cylinder below. Use 3.14 for π. Round your answer to the nearest tenth.



Try it on your own!

Mrs. Mirzayan is sending a package that is 8 ft by 3 ft by 2 ft. How much space does she have in the box?

Try it on your own!

A soda can in 8 inches tall and has a diameter of 6 inches. How much soda can fit in the can?