Rising 7th Grade Summer Assignment

Concept 1 - Negative Numbers/Absolute Value (6.NS.5, 6a, 7abcd)

Negative Numbers

On a number line, numbers get ______ to the right and ______ to the left. Any number to the left of 0 is called a ______. ALL negative numbers are ______ ALL positive numbers. The ______ of a number is its distance from 0. It is written: $| \ |$. You Try: $|7| = ____ |-4| = ____ |4| = _____$ Which two of the answers above have the same absolute value? Why? _____



You Try: Fill in the correct inequality symbol. Use the number line if it helps.



Real-World Situations: Numbers can be negative in real-world situations also. Write a positive or negative number to represent the following situations:

a) The temperature is 40⁰ in Virginia. _____ b) The temperature is 17⁰ below zero in Alaska. _____

c) You sell a CD and earn \$8. _____ c) You owe your friend \$17. _____

Challenge: It is 30^0 below zero at the South Pole and 23^0 below zero at the North Pole. How much colder is it at the South Pole?

Higher-Level Questions for Discourse

1. Can fractions and decimals also be negative? Why or why not?

2. Why is a negative number with a larger number after the negative sign actually a smaller value?

Concept 1 Released EOG Questions (6.NS.5, 6a, 7abcd)

21 Jeff recorded the average temperatures for six months. He will display the temperatures on a number line.

Month	Temperature (°F)
December	-5
January	-16
February	-15
March	20
April	24
May	35

On the number line, which month's temperature will be between February's and March's temperatures?

- А December
- В January
- С April
- D May

Which point on the number line represents the number $-4\frac{1}{2}$? 37

4



38 This table shows the number of miles four friends travel to get to school.

Student	Distance to School (miles)							
Andie $1\frac{3}{8}$								
Helen $1\frac{2}{3}$								
Michelle 1 ⁵ / ₉								
Troy 14/9								
greatest distance to school?								
S								

Who travels the greatest distance to school?

- Andie А
- В Helen
- С Michelle
- D Troy

Concept 2: Dividing Fractions, Decimal Operations, Factors, and Multiples (6.NS.1, 2, 3, 4)

Dividing Fractions

The Visual: Create a visual model to solve: Susan has $\frac{2}{3}$ of an hour left to make cards. It takes her about $\frac{1}{6}$ of an hour to make <u>each</u> card. About <u>how many can she make</u>? _____ cards

Use the visual below to divide $\frac{2}{3}$ by $\frac{1}{6}$ (figure out how many $\frac{1}{6}$ pieces are in $\frac{2}{3}$).

i			1

The Math: To divide two fractions, multiply the first fraction times the ______ of the second.

Example: $\frac{4}{7} \div \frac{2}{5} = \frac{4}{7} \cdot \frac{5}{2} = \frac{20}{14} = 1\frac{6}{14} = 1\frac{3}{7}$ **You Try**: a) Divide $\frac{2}{3} \div \frac{1}{2}$ b) Divide $6 \div \frac{2}{3}$ c) Divide $\frac{5}{6} \div 4$

When interpreting word problems to divide fractions, the same key words apply as for whole numbers.

______ are all key words for division. Additionally, problems involving area can sometimes be solved using division.

Decimal Operations

To add or subtract decimals, ______ and use the regular steps.

To multiply decimals, ______ to the right of the decimal in each number.

Then, use the regular steps to multiply. Then, count back from the right and put the decimal back in!

To divide decimals, _________ to the right in the divisor and dividend to get a whole number divisor. Then, use the regular steps to divide and move the decimal straight up in the division.



Factors and Multiples

Factors to e	qual a number. Multiple	es are produced when a number is multiplied.
Example: Factors of 24 are 1, 2	4, 2, 12, 3, 8, 4, and 6.	Multiples of 24 are 24, 48, 72, 96, etc.
To find the greatest common fa	actor (GCF) of 2 number	er:
1. Find the	of each numb	ber (what prime numbers multiply to equal the number)
2. Multiply all the	prime factors	<u>Greatest Common Factor</u> 1) Prime Factors
		36 54
To find the least common mult	iple (LCM) of 2 number	$\text{Prs:} \begin{array}{c} 4 \\ 2 \\ 2 \\ 3 \\ 3 \\ 3 \\ 3 \\ 6 \\ 9 \\ 12 \\ 15 \\ 18 \\ 21 \\ 24 \\ 27 \\ 30 \\ \end{array}$
1. List the	_ of each number	2) Shared: Multiples of 5 3) Multiply 5 40 45 50 25 20 25 40 45 50
2. The first number that is in	is t	the LCM Least Common Multiple (LCM) = 15

Higher-Level Questions:

1. What is one way to find a common multiple for two numbers, even if it isn't the LCM? Why does this work?

2. Why do we line up the decimals to add or subtract decimals but not to multiply or divide?

Concept 2 Released EOG Questions (6.NS.1, 2, 3, 4)

A rectangular parking lot has an area of $\frac{2}{3}$ of a square kilometer. The width is $\frac{1}{2}$ of a kilometer. What is the length, in kilometers, of the parking lot?



- 3 The price of a theater ticket increased from \$7.50 to \$7.75. The theater sold 315 tickets at the higher price. With the price increase, how much more did the theater earn on the tickets?
 - A \$78.00
 - B \$78.25
 - C \$78.50
 - D \$78.75
- 8 A rectangular room has an area of $131\frac{1}{4}$ square feet. The length of the room is

 $12\frac{1}{2}$ feet. What is the width, in feet, of the room?

- Allen is building birdhouses that require $\frac{1}{2}$ -ft-long boards. How many pieces that are exactly $\frac{1}{2}$ ft long can be made from a board that is $8\frac{1}{4}$ ft long?
- 10 How much money should John get back when he uses \$10.00 to pay for purchases totaling \$5.25?

Express the answer as dollars.cents.

- 11 What is the product of 2.52 and 3.4?
- 13 What is the greatest whole number that is less than $\left(\frac{5}{2}\right)^3 \div \left(\frac{3}{4}\right)^2$?

20 Marcy is taking two types of medicine.

- She takes one medicine every 6 hours.
- She takes the other medicine every 4 hours.
- She takes both medicines at 9:00 a.m.

At what time will Marcy take both medicines together again?

- A 1:00 p.m.
- B 3:00 p.m.
- C 5:00 p.m.
- D 9:00 p.m.

A ratio can be expressed as	to	OR			to							
The notation can either use a colo	on (:) or a fract	tion bar.										
Unit Rate												
Unit rates can be	times a	given number	of	items	s to :	find	a to	otal	val	ue		
Common real-world unit rates inc	lude											
Percents - Rates expressed as parts out of												
Percents can be used to find a uni	t rate based or	n item	ns (o	lividi	ng ł	У		_)				
Representations of Rates and Ratios												
Unit rates and ratios can be represented a	s written desc	riptions, table	es, e	quati	ons	, and	l gra	aph	s.			
You Try: Snicker bars at your favorite st	tore are on sal	e at 2/\$1.50.										
A) What is the unit rate for a Snicker bar	?Ho	ow did you fig	ure	it ou	t?							
B) Create a table representing the cost of	up to 10 Snic	ker bars.										
Snickers												
C) Graph these points. What do you notic	ce about the g	raph?										
	8	10	y									
		10 9 -									_	
		8 -	-		_	_	-	_	-	_	-	_
D) How much would 25 Snicker bars cos	st?	- 7 -	-		_	_	-	-	-	-	+	-
How did you figure that out?		6 -	+		-	-	+	+	+	+-	+	-
		5 -	-			-	-	-	-	-	-	-
		4 -	-		-	-	+	-	+	+	+	-
		3 -	-			-	-	-	+	-	-	-
		2 -	-		-	-	+	+	+	+	+	1
		1 -	+		-		-	-	-	-	+	1
				1 I I		1			1			

2. Are the ratios 4:3 and 3:4 the same? Why or why not?

Concept 3 Released EOG Questions (6-RP.1, 2, 3)

- 1 Joe will go to the swimming pool on 20 different days this month.
 - A one-day pass to the pool is \$2.25.
 - A monthly pass to the pool is \$30.00.

How much money will Joe save by buying a monthly pass?

- A \$20
- B \$18
- C \$15
- D \$12
- 7 A recipe requires $\frac{1}{4}$ lb of onions to make 3 servings of soup. Mark has $1\frac{1}{2}$ lb of onions. How many servings can Mark make?
- 12 At a store, Susan selected a pumpkin that weighed 35.2 ounces.
 - Pumpkins cost \$1.80 per pound.
 - There are 16 ounces in 1 pound.

How much did Susan's pumpkin cost?

Express the answer as dollars.cents.

- 15 Heather earns \$8.00 per hour for walking a dog. How many hours must she work to earn \$256.00?
- 16 One serving of Mike's crackers has 150 calories and a mass of 30 grams. How many calories are in 6 grams of the crackers?
 - A 5
 - B 10
 - C 25
 - D 30
- 17 The ratio of nitrogen to potassium in a sample of soil is 12:9. The sample has 36 units of nitrogen. How much potassium does the sample have?

. ~

- A 21 units
- B 27 units
- C 33 units
- D 48 units

- 18 To clean a tank, $\frac{3}{4}$ cup of disinfectant is needed for every 2 gallons of water. How many cups of disinfectant are needed for 20 gallons of water?
 - A $7\frac{1}{2}$ B 15 C $22\frac{1}{2}$
 - D 30
- 19 A laundry detergent is sold at four stores.

Store	Size (ounces)	Price
Hawkin's Store	60	\$6.50
Don's Store	54	\$5.50
Allen's Market	48	\$5.61
Value Market	40	\$4.50

Which store has the lowest price per ounce?

- A Hawkin's Store
- B Don's Store
- C Allen's Market
- D Value Market
- 34 A company that makes boxes finds that 3 out of 20 boxes are damaged. What percent of the boxes are damaged?
 - A 12%
 - B 15%
 - C 25%
 - D 34%
- 35 Jack drew a number line on his paper.



Jack drew a new point 45% of the distance from point E to point J. Between which two letters does the new point lie?

- A G and H
- B I and J
- C F and G
- D H and I
- 36 Valerie is 64 inches tall. About how many centimeters tall is Valerie? (1 inch ≈ 2.5 centimeters)
 - A 25.6
 - B 30.6
 - C 160
 - D 180

Concept 4: Relationships in the Coordinate Plane (6.NS.6bc, 8, 6.G.3)

Quadrants and Signs

Write the SIGN (positive or negative) that applies to the numbers on each side of the number line.



Concept 4 Sample EOG Problems (6.NS.6bc, 8, 6.G.3)

- A trapezoid in a coordinate plane has vertices (-2, 5), (-3, -2), (2, -2), and (1, 5). 22 What is the height of the trapezoid?
 - А 3 units
 - В 5 units
 - С 7 units
 - D 9 units
- The shaded area indicates the parking lot at a shopping center. 28



What is the total area of the parking lot?

- 72 units² А
- 86 units² В
- 91 units² С
- 120 units² D
- What is the area of the quadrilateral with vertices at (-1, 0), (2, 0), (2, 5), and 30 (-1, 5)?

Α

В

С

D

- Α 15 square units
- В 12 square units
- С 10 square units
- 5 square units D
- In the coordinate plane, what is the distance between (-3, 5) and (-3, -8)? 39
 - А 3 units
 - В 6 units
 - С 8 units
 - 13 units D

In the graph below, each grid square represents one square yard. 47



Concept 5: Algebraic Expressions (6.EE.1, 2, 3, 4)

Vocabulary:	
Sum	Difference
Quotient	Product
Factor	Coefficient
Term	
Variable	
Exponent	
Base -	
When you evaluate expression for given num	nbers, the number the variable.
Then, use the correct order of operations. (Pl from left to right).	EMDAS, but remember, and go together
You try	
1. $b + 5 + d$, when b = 2.7 and d = 5.12	2. $\frac{n-3}{10}$, when n = 4
3. $3(2x^2 - 5)$, when $x = 4$	4. $(x + 2)^3 + 10$, when $x = 5$
Distributive Property: Use the order of ope	erations to simplify:
A) 5(3 + 4)	B) $5(3) + 5(4)$
C) What do you notice?	
The distributive property - when you multipl	ly one term $a(b+c) = ab+ac$

You Try:

A) 4(x - 6) =_____

You distribute the **a** to the **b** and, then you distribute the **a** to the **C**.

B) 3(4x + 2y) = _____

Combining Like Terms

You make \$12/lawn mowing lawns in your neighborhood, and your friend only makes \$9/lawn. If you both mow the same number of lawns, how much more do you make? (Use *x* to represent the number of lawns.)

Your total money made = x Your friend's total money made = x

How much more you made = _____ - ____ = _____

What do you notice about the expression in your answer?

Combining Like Terms - when you add or subtract terms with

the same variables AND same exponents, you add or subtract

_____ but leave the variables and exponents the same

Higher-Level Questions for Discourse

1. How are adding, multiplying, and exponents related?

Col	lect like terms	5
<u>4a</u>	+ <u>5</u> + <u>2a</u> - <u>3</u>	3
	= 6a + 2	

2. Are numbers like terms? Why or why not?

Concept 5 Released EOG Questions (6.EE.1, 2, 3, 4)

4	Han	nah babysits to earn money.	5	What	t is the value of $\left(\frac{1}{2}\right)^3$?
		She charges \$6.50 to babysit for the first hour.			(7)
		 She charges \$5.75 for each additional hour. 			3
		• Let <i>n</i> equal the number of hours after the first hour.		Α	7
	Whie	ch expression represents how much Hannah charges?			
	Α	12.25n		В	$\frac{1}{7}$
	В	6.50 + 5.75n			
	С	6.50n + 5.75		С	3 343
	D	6.50n + 5.75n			
				D	$\frac{1}{343}$
14	Wha	at is the value of $\frac{1}{3}x^2 + 2$, when $x = 3$?			

23	Which can be represented by the expression $17 - 2x$?			4 Which expression is equivalent to $5y + 2y + 6x + 2$				
	Α	17 less than twice a number x		Α	5x + 6y			
	В	the difference between 17 and twice a number x		в	5x + 7y			
	С	a number x squared, subtracted from 17		С	5x + 9y	C		
	D	17 less than a number x squared		D	7x + 7y			

40 Which choice is equivalent to the expression 4(x + 2y)?

Α	4x + 8y	43	Jane wants to visit her sister.
B C	4x + 2y $x + 8y$		 Her car travels x miles per gallon of gas. She will travel 1,000 miles to her sister's house. Gas costs \$3.50 per gallon.
D	8 <i>xy</i>		Which expression shows how much Jane will spend for gas on the trip to her sister's house?
			A 1,000(3.50x)
			B $3.50\left(\frac{1,000}{x}\right)$
			C $3.50\left(\frac{x}{1,000}\right)$

D

 $1,000\left(\frac{1}{3.50x}\right)$

42 The length of a rectangle is 6 units longer than the width, *w*. Which choice is a correct expression for the perimeter of the rectangle?

- A 2w+6
- B 2w + 12
- C 4w + 6
- D 4w + 12

Concept 6: Equations and Inequalities (6.EE.5, 6, 7, 8)

The solution, or answer, to an equation is the number that replaces the variable to make the equation ______. You try: What number replaces the variable to make the equation true? (Use the visual if you need.) A) 4 + x = 11B) x - 8 = 2C) 5x = 40D) $x \div 9 = 4$ 11 40 9 9 9 9 Х 2 8 Х 4 Х Х Х Х Х Х What relationship do your answers have to the original numbers? What type of operations can help us solve equations? You Try: Use opposite operations to solve these equations (it's the same process, just with rational numbers!) B) x - 5 $\frac{1}{2}$ = 3 A) 7.5 + x = 14.3C) 4.2x = 16.8

Equations can also be used to find missing values in word problems. The same key words can be used to set up the equations:

Addition	 	
Subtraction	 	
Multiplication		
Division -		

You Try: Kiara has earned 15 extra credit points in English class for her outside reading, but she really wants to earn a total of 29 points. How many more points does she need? (Set up and solve the equation.)

Inequalities

Sometimes, we are trying to determine what numbers will complete a true number statement to be _____

or ______ another number. The process for solving these is the same as equations, but you flip the

inequality sign to the other direction when you _____

We can graph these solutions on a ______, because the answer is a range of values.



Look at the number lines above. What do you notice about the inequality signs and graphs?

Complete the following table with the characteristics of these graphs.

	Includes Equal To	Not Equal To
Greater Than		
Less Than		

Higher-Level Questions for Discourse

- 1. What does it mean to "solve" an equation or inequality?
- 2. Why does a linear equation have one solution but a linear inequality has many solutions?

Concept 6 Released EOG Problems (6.EE.5, 6, 7, 8)

- 25 Diana can use the equation y = 7x to calculate her pay, where y represents the amount of pay, and x represents the number of hours worked. How many hours did Diana work if she was paid \$45.50?
 - A 5.5 hours
 - B 6 hours
 - C 6.5 hours
 - D 7 hours
 - 26 If y 18 = 14, what is the value of 3(y + 5)?
 - A 27
 - B 32
 - C 96
 - D 111
 - 27 Karen recorded her walking pace in the table below. What equation **best** represents this relationship?

Hours Walked (h)	Miles Walked (m)
2.5	8.75
4	14

- A h = m + 10
- B *h* = 3.5*m*
- C m = h + 10
- D m = 3.5h
- 44 Suppose that a stove and a freezer together weigh at least 370 pounds. The weight of the stove is 170 pounds. Which inequality correctly describes these conditions for the weight of the freezer, *f*?
 - A $f \ge 200$
 - B f > 200
 - C *f* ≤ 200
 - D f < 200

Concept 7 - Geometry (6.G.1, 2, 4)

Area	
Perimeter	
Volume	
Surface Area	
Demonstrations:	← 4 →
Area of a Rectangle : Base = 4 feet, Height = 3 feet	
The rectangle to the right is broken into 1 foot sections.	3
How many sections are there?	
What is the area?	
How do the length and width relate to the area?	
Formula for Area of a Rectangle:	_
Area of a Triangle	$\leftarrow 4 \rightarrow$
The rectangle at the right is broken into 2 triangles.	
Based on the area of the rectangle, what is the area of each triangle?	
How did you figure that out?	
Formula for Area of a Triangle:	
Volume	
The prism at the right is broken into blocks, each one unit per side.	
How many blocks are in the bottom layer?	
How do you know?	3 blocks
How many blocks are in the whole prism?	4 blocks
How do you know?	- 5 blocks deep wide
Formula for Volume of a Prism:	_
Area of Other Shapes: The shape at the right is broken into a rectangle	e and a triangle.
What is the area of the rectangle?	
What are the base and height of the triangle? and	
How do you know?	9cm
What is the area of the triangle?	
What is the area of the whole shape?	
How do you know?	

Concept 7 Released EOG Questions (6.G.1, 2, 4)

29 The right rectangular prism below is made up of 8 cubes. Each cube has an edge length of $\frac{1}{2}$ inch. 41 Wh



What is the volume of this prism?

- A 1 cubic inch
- B 2 cubic inches
- C 4 cubic inches
- D 8 cubic inches
- 31 The net of a triangular right prism is shown below.



What is the surface area of the prism?

- A 204 in.²
- B 228 in.²
- C 240 in.²
- D 288 in.²

Α

В

С

46 What is the volume of the right rectangular prism below?





45 The Wilsons want to put outdoor carpet on their porch.



48 Abby is making a decoration. When folded, the decoration is a triangular pyramid made of four congruent equilateral triangles. *Approximately*, what is the surface area of Abby's decoration?



A

в с

D

D $2\frac{1}{8}$ cubic inches

Concept 8 - Dat	a (6.SP.1,	2,	3,	4, 5)	
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Mean							
Median							
Quartile							
Mean Absolute	e Deviation (MAD)					
Range							
Interquartile R	ange						
Example							
13 students con	mpared scores on t	heir math midt	erm. They wer	e: 60, 68, 71, 73,	76, 81, 82,	82, 85, 89, 92,	, 95, 99
1. Calculate the	e mean, median, q	uartiles, range,	and interquarti	le range of the sc	cores.		
Mean	Median	Q1	Q3	Range	I	QR	
2. Construct a	dot plot, histogram	n, and box-and-	whisker plot fo	or the data.			
		60	70	80	90	100	
		vv	1 V	00	90	100	



What do you notice about each representation? Which is the best for this data set? Why?

Concept 8 Released EOG Questions (6.SP.1, 2, 3, 4, 5)

6 Which choice shows a set of data that could be represented by the box plot shown below?



50 The weather station recorded the high temperature each day for 30 days. The graph of the temperature data is shown below.





The data below represents the numbers of books that twelve students read.

2, 4, 7, 8, 9, 12, 14, 18, 19, 21, 30, 32





Which box plot represents a set of data with the largest interquartile range?



32



- 49 Katherine earned 84, 92, 84, 75, and 70 on her first 5 tests. What is the minimum grade Katherine needs to earn on the next test to have a mean of 84?
 - A 81 B 84 C 95 D 99