Name:

8th Grade Summer Math Packet

Dear Future 8th Grader,

This summer math packet is designed to help you keep your math skills strong before returning to 8th grade in the fall. We want you to feel confident on the following skills and problems when you begin 8th grade. If you get to a problem you are confused on, here are some ideas to help:

- Ask a parent/guardian, family member, or friend
- Go to www.khanacademy.org and search for a video to help you remember that concept
- Practice that skill on Khan Academy and try to improve your score
- Look at your math notes or SpringBoard book from 7th grade
- Mark that problem with a "?" to remember to ask your 8th grade teacher in the fall

Up first, we'd like you to practice your **math facts** over the summer and return to 8th grade strong. Please work on the following:

• Multiplication Facts (1-12's)

• Division Facts (1-12's)

You can find flash cards for these at any dollar store, or you can search "Math Facts Flash Cards" online to download and print a set. **Practice, practice – we want you to have these memorized!**

The rest of the packet is review problems from 6th and 7th grade math. Do your best to complete them all and show your work! You should <u>not</u> use a calculator unless you see the calculator icon next to a **problem.** Bring your completed math packet to your 8th grade math teacher in the fall – *and happy solving*!

1. 3.175 + 12.8

2. 257.4 - 94.25

3. 325.9×-1.02

4. $4.3 \div 0.12$





- 5. 1,407 + (-12.65) 6. 5,387.25 14.041
- 7. $-1.75 \cdot 3.1$ 8. $4.636 \div -0.38$

- Keisha bought a notebook for \$4.98 and a pack of pencils for \$1.49, tax included. She paid with a \$10 bill. About how much change should Keisha receive? Select all estimates that apply.
 - \$3.50
 - \$4.00
 - \$5.00
 - \$6.00
 - \$16.50
- 10. Will paid \$2.73 for 3.5 pounds of bananas. What was the cost per pound of the bananas?

A	\$0.078
В	\$0.78
С	\$1.28
D	\$9.55

11. Allison ran $5\frac{1}{3}$ miles on Saturday and $3\frac{3}{4}$ miles on Sunday. How much farther did she run on Saturday than on Sunday?

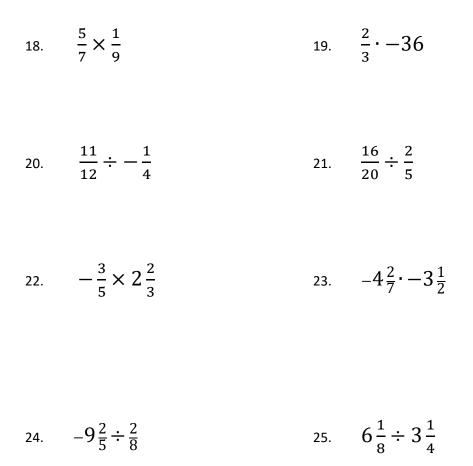


12. Express $5\frac{5}{8}$ as a decimal.

13. Give three fractions that are equivalent to $\frac{14}{20}$. Show your work!

14.
$$-\frac{2}{5} + \frac{3}{6}$$
 15. $\frac{9}{13} + \frac{4}{5}$

16. $\frac{5}{8} - \frac{1}{4}$ 17. $-\frac{11}{16} - \frac{2}{3}$



26. Convert each fraction into a decimal using long division. Decide whether each decimal is a terminating or repeating decimal:

$\frac{4}{5}$	$\frac{8}{9}$	$\frac{11}{20}$	$\frac{4}{6}$

27. Which fractions below are equivalent to $\frac{24}{32}$?

2	-24
a.	32
b.	$\frac{-24}{-32}$
c.	$\frac{12}{16}$
d.	$\frac{-6}{-8}$
e.	$\frac{-3}{4}$

28. Find the value of each of the integer expressions below:

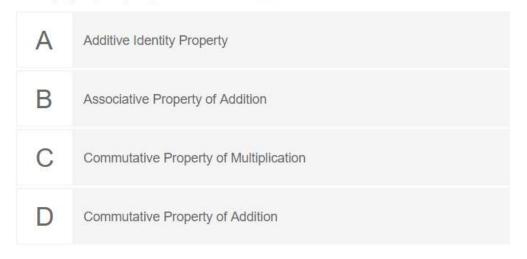
-24 + 9 + (-6)	-22×4	$(330 \div -10) + (-17)$
-2 + -8 + -5	32 - 78	(6)(-3)(-2)
$\frac{225}{-5}$	$\frac{-56}{-8}$	$\frac{-70}{7}$
(-45) + (-60)	(13) · (-6) · 4	$-10 \div 2 + 14 - 7$

29. Apply the Distributive Property to each expression to create an equivalent expression:

$$4(r-6)$$
 $3(6a+2a+1)$

$$(m+n) \cdot 3$$
 $10x - 4x + 8(x - 2)$

30. Which property of operations does the statement c + d = d + c illustrate?



31. Evaluating the expression $4\frac{5}{6} + 2\frac{1}{2} - 4\frac{5}{6}$ using mental math and the properties of operations results in a value of

А	0
В	$2\frac{1}{2}$
С	$7\frac{1}{3}$
D	$12\frac{1}{6}$

32. Which expressions are equivalent to 16y + 28?

Check all that apply.

- 4(4y+7)
- 8(2y+28)
- 2(8y+14)
- 8(2y+4)-4
- 2(8y+10)+18
- 2y + 7(2y + 4)

The expression x + 0.25x can be used to determine a 25% increase in the number of blog views from last month to this month. What expression shows this another way?

А	x(x+0.25)
В	$0.25\left(x+1 ight)$
С	0.25x + 1
D	x (1.25)

34. A taxi ride costs \$1.25 per mile, *m*, in addition to a fee of \$3.75. The total cost of the taxi ride is \$13.75.

The equation can be used to determine the number of miles driven.

35. A plumber charges \$20 per hour plus the cost of any materials. The total cost for a repair made on Monday was \$845, including materials costing \$648. Which equation represents the number of hours, *h*, the plumber worked on the repair?

A	20h + 648 = 845
В	20h - 648 = 845
С	648 + h + 20 = 845
D	648 = 845 - 20 - h

36. What value of x makes this equation true?

$$\frac{1}{8}x - 2 = -5$$

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	u		i C	٠

Kiera is cleaning her neighbor's garage. She is being paid a \$25 flat fee and \$8 per hour for each hour that she works. Kiera makes a total of \$81.

What is an equation that can be used to determine x, the number of hours Kiera worked?

How many hours did Kiera work?

hours

38.

Simon brought water to the class picnic. The water came in packs of 24 bottles. After 317 bottles were used at the picnic, there were 43 bottles left.

What equation can be used to find how many packs of water Simon brought to the picnic?

Α	43 + 24p = 317
В	43 - 24p = 317
С	24p - 43 = 317
D	24p + 43 = 317

39. Solve each multi-step equation:

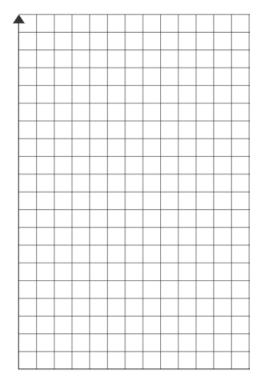
4x + 3 = 19	12(m-1) = 24	8b + 2b + 6 = -20
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40a. For each order, a T-shirt company charges a \$50 setup fee and \$4 per T-shirt. Write an equation that represents the situation using C for total cost and t for the number of t-shirts sold.

40b. Complete the table of values to show the total cost for up to 10 t-shirts sold.

C (total cost)	t (number of t-shirts sold)
\$54.00	1
	2
	3
	4
	5
	6
\$78.00	7
	8
	9
\$90.00	10

40c. Create a graph of the data. Be sure to label both your axes and choose your scale correctly.



40d. Identify the independent and dependent variables in this situation. Explain why each variable is either independent or dependent.

40e. How much would it cost to order 35 t-shirts? How many t-shirts could you order with a budget of \$140? Use your equation to answer each question and show your work.

Carlos has \$175. He spends \$43 on a pair of pants and wants to buy as many T-shirts as he can. T-shirts are on sale for \$12 each. What inequality can be used to determine the number of T-shirts Carlos can buy?

А	12s+43<175
В	12s-43<175
С	$12s + 43 \le 175$
D	$12s - 43 \leq 175$

42. Solve the inequality.

 $18 - 3x \le 72$

43. Solve the inequality algebraically.

 $\frac{3}{4}y + 15 > 27$

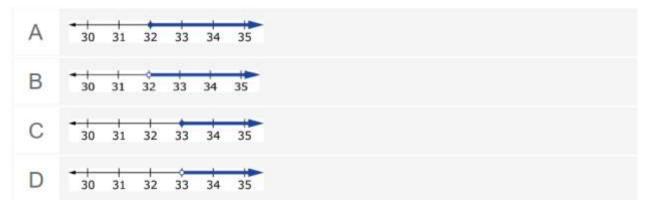
44. What graph shows the solution to the inequality?

 $A \xrightarrow[-16]{-16}{-14} \xrightarrow{-12}{-10} \xrightarrow{-8}{-6} \xrightarrow{-4}{-2}$ $B \xrightarrow[-16]{-14}{-12}{-10} \xrightarrow{-8}{-6} \xrightarrow{-4}{-2}$ $C \xrightarrow[-16]{-14}{-12}{-10} \xrightarrow{-8}{-6} \xrightarrow{-4}{-2}$ $D \xrightarrow[-16]{-14}{-12}{-10} \xrightarrow{-8}{-6} \xrightarrow{-4}{-2}$

$$7(2z-8) < -140$$

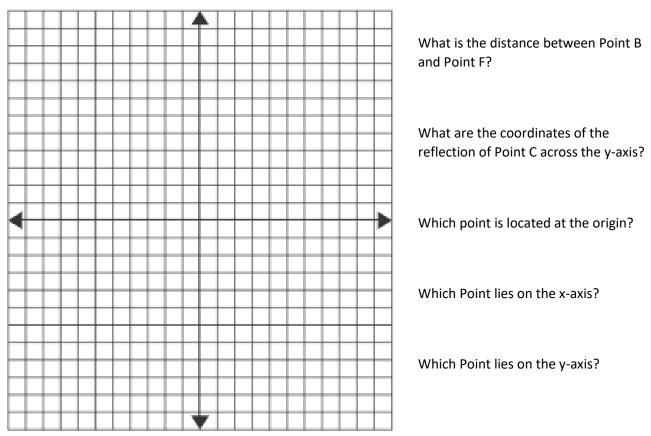
45. Mario is hoping to raise at least \$275 for charity. His neighbor donated \$11 and he has pledges for \$8 for each hour of community service he performs.

Which graph represents the number of hours of community service Mario needs to perform?



46. Graph and label each ordered pair on the coordinate plane:

A (0, 0)	B (3, 8)	C (-2, 7)	D (-5, -5)
E (6, -4)	F (3, 0)	G (0, -5)	H (-1.5, -9)



Name: _____

47.

There are 9 boys and 11 girls in a math class. Which ratios compare the number of girls to the number of boys in the class? Select all that apply.

- 9:11
 11 to 9
 11:20
 9/11
 11:9
 11/9
 9 to 11
- 48. Which of the choices describe two situations with equivalent ratios?

Select all that apply.

- Malik threw 10 strikeouts in 5 innings. Ben threw 4 strikeouts in 2 innings.
- Maddie drove 60 miles in 1 hour. Andrew drove 45 miles in 45 minutes.
- Alex made 3 free throws in 10 seconds. Candice made 5 free throws in 15 seconds.
- Yuan completed 8 of 14 passes. Meredith completed 20 of 32 passes.
- Destiny paid \$2.00 for 2.5 pounds of bananas. Aaron paid \$2.80 for 3.5 pounds of bananas.
- 49. Allie rode her bicycle 46.8 miles in 4 hours. What was Allie's rate in miles per hour?

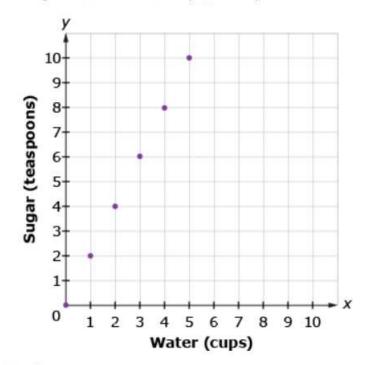
A	0.85 mile per hour
В	10 miles per hour
С	11.7 miles per hour
D	187.2 miles per hour

50. The table shows how often a hummingbird flaps its wings over time.

Time (minutes)	1	3	7	12
Number of flaps	70	210	490	?

How many times does a hummingbird flap its wings in 12 minutes?

51. The graph shows the relationship between sugar and water in a fruit punch recipe.



What does the point (2, 4) mean in this situation?

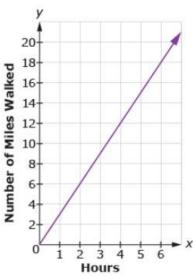
Write a ratio comparing the amount of sugar and the amount of water in the fruit punch recipe.

52. Stephanie walked 6 miles in 2 hours. The graph represents her pace.

What is her unit rate?

What is the constant of proportionality?

Write a linear equation to represent the situation and the graph. Use **y** for number of miles walked and **x** for the number of hours.



53. A student council sells 44 bouquets for \$176. Which equation represents the relationship of x bouquets to y dollars?

А	y = 0.25x
В	y = 4x
С	y = 44x
D	y = 176x

54. A painter is paid a standard hourly rate and makes \$41.25 for five hours of painting. How much is the painter paid for eight hours of painting?



55. The following table shows the money a different painter earned. What is this painter's hourly rate (constant of proportionality)? What does this mean in this situation?

Hours	Money Earned
3	\$29.25
4	\$39.00
5	\$48.75



56. The table shows the relationship between the number of movie tickets bought and the total price.

Number of Tickets	Price
1	\$12.75
2	\$25.50
3	\$38.25
4	\$51.00

What is the constant of proportionality?

Explain what the constant of proportionality means in this situation.

57. Which equation represents the situation in the table?

Number of building blocks $\left(x ight)$	3	6	9	12
Height of stack in centimeters $\left(y ight)$	3.6	7.2	10.8	14.4

A

$$x = 1.2y$$

 B
 $y = x + 0.6$

 C
 $y = 1.2x$

 D
 $x = 3y$

Name: ______



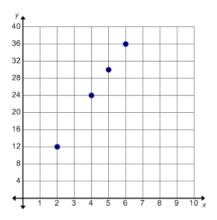
58. Use the table below to answer the question.

x	У
7	15.4
11	?

The table shows a proportional relationship between x and y. What is the missing value in the table?

А	22.4
В	24.2
С	26.4
D	27.5

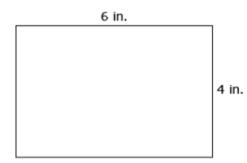
59. Use the graph below to answer the question.



Which equation could represent the relationship between x and y?



60. Josh is building a sandbox for his little sister. He uses these plans, which have a scale of 2 in.:3 ft.



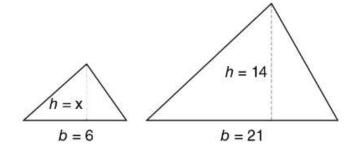
What will be the actual dimensions of the finished sandbox?

61.

The scale on a map is $\frac{1 \text{ inch}}{250 \text{ miles}}$. On the map, the distance from Nashville, TN to Los Angeles, CA is 8.02 inches. What is the actual distance from Nashville to Los Angeles?

miles

62. These triangles are similar.



What is the height of the smaller triangle?

63. Which equation represents the proportional relationship 4:18?

A	y = 0.222x
В	y = 4.5x
С	y = 4x
D	y = 18x

64. Complete the table:

Fraction	Decimal	Percent
1/2	0.5	50%
	0.75	
3/100		
		10%
2/5		
1		100%
		200%
13/20		65%
1/9		
		87.5%

65. What is 25% of 80?

66. What is 72% of 18?

67. 60% of 320 is what?

68. What percent is 20 out of 25?

i 69.

In a town, 8.5% of the population work at the factory. If there are 32,600 people in the town, how many people work at the factory?

70. In a large package of markers, 28 of the 448 markers are red. What percent of the markers are red?

71.

During a school election, 64% of the 775 total votes were for the winning candidate. How many votes were for the other candidates?



72. Karin's paycheck is \$148. She puts 22% of her paycheck into her savings account. How much from her paycheck does Karin put into her savings account?

А	\$22.00	
В	\$29.60	
С	\$30.80	
D	\$32.56	

If the tax rate is 8% and the cost of the tax on a purchase is \$34.88, what is the total cost of the purchase?

А	\$2.79
В	\$37.67
С	\$436.00
D	\$470.88

74.

A family spent \$128 on a meal at a restaurant. If they leave a 20% tip, how much would the waitress receive?

А	\$2.56
В	\$6.40
С	\$20.00
D	\$25.60

75.

Ashley has a job selling condominium vacation rentals and makes an 18% commission on each sale. She sells a \$2,420.50 vacation rental. Which equation finds the amount of her commission, *C*?

А	C=1.8 imes\$2,420.50
В	C = 0.18 imes \$2,420.50
С	2,420.50=0.18 imes C
D	2,420.50=1.8 imes C

Name: _____

76.

Last season, a soccer team won 9 games. The same team won 13 games this season. What is the percent increase in the number of games won, rounded to the nearest percent?

А	22%
В	31%
С	44%
D	69%

77.

The school volleyball team won 24 matches last season. This season it won 20 matches. To the nearest whole number, what was the team's percent decrease in wins from last season to this season?

Α	17%
В	20%
С	83%
D	120%

78.

The table shows the original price and discount for a pair of sneakers at four different stores.

	Original Price (\$)	Discount (%)
Store A	96	25
Store B	140	45
Store C	80	5
Store D	128	40

Which store will have the least expensive sneakers after the discount is applied?

A loan for \$900 at a rate of 11% was paid off in 6 months. Which equation could be used to determine the amount of interest that was paid?

А	I = 900 imes 11 imes 6
В	I=900 imes 0.11 imes 6
С	I = 900 imes 11 imes 0.5
D	I=900 imes 0.11 imes 0.5

80.

The receptionist at a veterinarian's office estimates that the wait to see the vet is about 15 minutes. The actual wait time is 18 minutes. To the nearest whole number, what is the percent error between the estimated wait time and the actual wait time?

Α	15%
В	17%
С	20%
D	22%

81. Evaluate each expression:

$2^3 + 4^1$	$4^2 \times 3$	9 ⁰

$$(-3.4)^2$$
 -2^5 17^1

82. Simplify each expression using PEMDAS:

$$(4+1)^2 \div -5 \cdot 3 + -7$$

$$10 - 4(24 \div 12) + 7 \div 7$$

$$5^3 - (25 \cdot -3) + 8^2$$

- 83. Complete each blank to show equivalent units of measurement:
 - a. 1 foot = _____ inches
 b. 1 yard = _____ feet = _____ inches

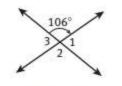
 c. 1 meter = _____ cm
 d. 1 centimeter = _____ millimeters (mm)

84. **Model with mathematics.** Two angles are supplementary. One measures $(3x)^{\circ}$ and the other measures 51° .

 Draw a pair of adjacent, supplementary angles and label them using the given information.

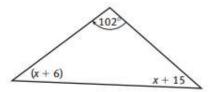
b. Write an equation to show the relationship between the two angles and solve for the value of *x*.

 Find the measure of both angles. Show your work. 85. Use the diagram.



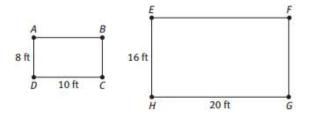
a. Find the measure of $\angle 1$.

 Reason quantitatively. Find the measure of each of the angles in the triangle shown.



- **b.** Find the measure of $\angle 2$.
- **c.** Find the measure of $\angle 3$.

- Determine whether it is possible to draw a triangle with the given side lengths. Justify your answers.
 - a. 8 feet, 6 feet, and 3 feet
- Construct viable arguments. Rectangle ABCD is 8 feet by 10 feet. Rectangle EFGH is 16 feet by 20 feet.

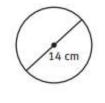


- a. Name the corresponding angles.
- b. Name the corresponding sides.
- c. Write the ratios of the corresponding widths and lengths of the rectangles.
- d. Are the corresponding sides in proportion? Explain.
- e. Is rectangle ABCD similar to rectangle EFGH? Explain.

- b. 4 meters, 5 meters, and 7 meters
- c. 6 inches, 8 inches, and 16 inches



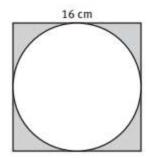
89. What is the area of the circle shown?



$$A = \pi \cdot r^2$$

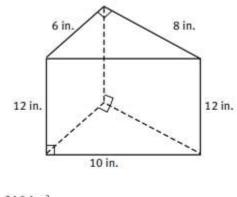


90. What is the area of the shaded region?



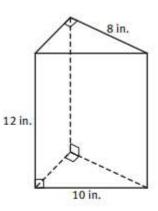


91. What is the surface area of the prism?



- A. 318 in.²
- B. 336 in.2
- **C.** 376 in.²
- **D.** 390 in.²

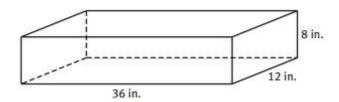
92. What is the volume of the triangular prism?

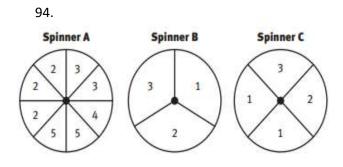


- A. 688 in.3
- **B.** 768 in.³
- **C.** 960 in.³
- **D.** 1040 in.³

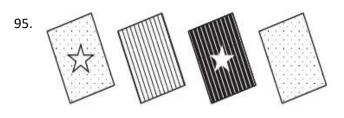


 How many cubes with side length of 4 inches will fit into the rectangular prism? Explain.





 For which spinner above is P(3) the greatest? Explain your reasoning.



 Create a tree diagram for choosing two cards from the stack of four cards shown above.

- **47.** What is the probability of choosing a card with a star when two cards are chosen?
- 48. Reason quantitatively. What is the probability of choosing two cards with stripes when two cards are chosen?
- **49.** What is the probability of choosing a card without stars when one card is chosen?

For which spinner above is P(2) the least? Explain your reasoning.

18. For which spinners above are P(1) and P(2) the same on the spinner?

i,

96.

The drama club has two performances on Saturday. The data represents the age of randomly sampled audience members at each performance.

Afternoon: 20, 12, 80, 15, 17, 42, 4, 33, 35, 15, 13, 17, 6, 26, 8

Evening: 34, 30, 20, 18, 59, 16, 23, 75, 56, 54, 19, 23, 34, 14, 48

Complete the table:

	Afternoon	Evening
Mean		
Median		
Mode		
Range		

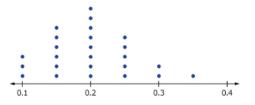
Jared wants to find out how many e-mails the 128 seventh graders in his school receive each week. What is the fairest way for Jared to select a random sample of seventh graders?

А	Assign each seventh grader a number, 1–128, and write the numbers on slips of paper. Then mix up the numbers and choose ten as a sample.
В	Assign each seventh grader a number, 1–128, and write the numbers on slips of paper. Then choose numbers 1–10 as a sample.
С	Assign each seventh grader a number, 1–128, and write the numbers on slips of paper. Then choose 10 seventh graders from the boys' basketball team as a sample.
D	Assign each seventh grader a number, 1–128, with the girls assigned numbers 1–79 and the boys assigned numbers 80– 128. Then choose five numbers from the girls group and five numbers from the boys group.

98. What is the relationship between a sample and a population?

Α	A sample is a census that represents a population.
В	A sample and a population share the same meaning.
С	A sample is a small part of a population that represents that population.
D	A population is a small part of a sample that represents that sample.

99. A store has a large barrel of different-colored marbles. The dot plot shows the sample proportions of blue marbles found in 25 random samples of 30 marbles from the barrel.



Based on the data in the dot plot, what is most likely to be the percent of blue marbles in the barrel?

А	10%
В	20%
С	25%
D	30%

Mathematics Vocabulary Review

For each mathematics vocabulary term: Read the word, read the meaning in math class, and read the related words. Then, give a description or example of the word (*look through this packet for ideas!*). Draw a visual representation of the word if you know one. Finally, add any more synonyms for the word that you know.

Word	Meaning (in math)	Description/ Example	Visual Representation	Related Words (synonyms)
Evaluate	To find the value of an expression.			Solve Simplify Answer
Analyze	Examining parts to understand how they work together.			Break down Look for patterns Make predictions Draw conclusions
Simplify	To break down into a simpler form using properties of operations.			Reduce Break down Solve
Reduce	The process of converting a fraction or mixed number to an equivalent fraction or mixed number, in which the greatest common factor of the numerator and the denominator of the fraction is one.			Simplify Simplest form
Solution	The answer to a problem or the value that makes an equation true.			Answer
Equivalent	Quantities, numbers or expressions that have the same value.			Equal Same

Classify	To sort into categories or to arrange into groups by attributes or characteristics.		Sort Group Identify characteristics Compare/contrast
Approximate	A value that is close to an exact value. To estimate or come close to an exact value.		Estimate Round
Algorithm	A step by step method for solving a problem.		Rule Process Method
Operation	The math processes of addition, subtraction, multiplication, division and manipulating numbers with other operators (exponents, grouping symbols, roots).		Process
Variable	An unknown or varying quantity. A symbol (usually a letter) that represents a number.		Unknown Varying amount Missing value
Expression	A mathematical phrase that can contain numbers, variables (like x or y) and operators (like add, subtract, multiply, and divide).	Does <u>not</u> contain an equal (=) sign.	Number phrase Number sentence
Equation	A statement of equivalence of two mathematical expressions. A mathematical statement that shows that two quantities or expressions have an equal value.	Contains <u>only ONE</u> equal (=) sign.	Equal Equivalent Equal values

Terms	Parts of a mathematical expression, separated		Parts Pieces
	by addition or subtraction operators.		
Constant	A number having a fixed value that does not change or vary.	Contains NO variables.	Number
Ratio	A comparison of two quantities using a colon, written as a fraction, or with the word "to".		Comparison Fraction
Rate	A ratio that compares quantities measured in different units.		Rate of change Constant rate Unit rate Speed Constant of proportionality Slope (on a graph)
Slope	The ratio of change in the vertical axis (y-axis) to change in the horizontal axis (x-axis); the steepness of a linear graph.		Rate of change Constant of proportionality Constant rate Steepness of a graph
Unit	A quantity of one. A label used to identify a mathematical quantity or amount.	Answers should always be labeled with units, if possible.	One Label
Composite	A number that has 2 or more whole number factors – factors other than itself and 1.	*Composite has two different meanings in math!*	Complex Compound
	A figure that is made by composing smaller shapes or figures.		

Prime	A number that has only two whole number factors – 1 and itself.	Prime numbers are only evenly divisible by 1 and	
		the number itself.	
Rational	Any number that can be written as a fraction or ratio.		Ratio Fraction
Radical	The symbol $\sqrt{-}$, which is used to represent the square root or nth root of a number.		Root Square root
Base	A number in a power that is multiplied by itself – how many times is indicated by the exponent. The "bottom" of a 2-D shape. The dimension on a 2-D shape that is perpendicular to the height. The bottom face (flat	*Base has MANY different meanings in mathematics!*	Bottom The "big" number in a power
Exponent	surface) of a 3-D shape. A number that indicates how many times a base number should be multiplied by itself.		The "little" number in a power Squared Cubed
Power	The number of times the base number is to be multiplied by itself when working with exponents.		
Table	A chart used to organized information or data.		Two-way table Input-output table Chart

	Data that any take and		C_{-} (1)
Continuous	Data that can take any of an infinite number of values between whole numbers. A graph in which there are no gaps or holes (e.g., a line graph).		Connected Line graph
Discrete	Distinct values that are not connected by intermediate values and are a finite set of values. A discrete graph is a series of points that are not connected by a continuous line.		Disconnected Points No in-between values
Origin	The point of intersection of the x- and y-axes in a coordinate plane, where the x-coordinate and y-coordinate are both zero (0, 0).		(0, 0) The "center" of the coordinate plane
Net	A two-dimensional diagram that can be folded or made into a three-dimensional figure; typically used to find the surface area of a 3-D figure.		Unfolded Flat Surface area
Translation	A transformation in which every point in a figure is moved in the same direction and by the same distance.		Slide Shift

Reflection	A flip of a flat figure across a line of symmetry that creates a mirror image. Reflections are sometimes across the x- axis or y-axis on the coordinate plane.		Flip Mirror image
Rotation	A transformation of a figure by turning it about a point or axis. The amount of rotation is usually expressed in the number of degrees (e.g., a 90° rotation). The direction of the rotation is usually expressed as clockwise or counterclockwise.		Turn
Mean	The average. A measure of center in a set of numerical data, computed by adding the values in a list and then dividing by the number of values in the list.		Average
Median	The middle value of a set of data that are arranged in order of size.		Middle
Interval	Distance between two points, amount of time between two events, or a range of numbers on a graph (ex: histogram).		Group Range Bucket

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