Module 3 Study Guide 9/7/17

1. I can write a Ratio in several ways.

Ratio: A comparison of two quantities using division *Order Matters when you write a ratio. *There are 3 ways to write a ratio (1:4, 1 to 4, ¼) *Always simplify your ratio	**Your Turn** In Mrs. Washington's class, there are 5 students who own an ipad and 15 students who own an iphone. A. What is the ratio of iphones to ipads? 15:5 B. What is the ratio of ipads to iphones? 5:15 c. What is the ratio of iphones to total students? 15:20 D. What is the ratio of ipads to total students? 5:20
	For the following ratio, create two part to whole ratios: *The ratio of yellow to blue marbles is 4 to 9.* 4:9 $\frac{4}{9}$ $\frac{12}{27}$ 20:45 For the following ratio, create a second part to whole and a part to part. *3 out of 10 prefer math over science class.* $\frac{3}{10}$, $\frac{15}{50}$

2. I can write a Ratio to compare two quantities and explain the meaning of the Ratio.

What does a ratio actually mean? Example: What is the ratio of circles to triangles?  The ratio of circles to triangles is 2:3. What does this ratio mean? **For every two circles, there are 3 triangles.**	A. What is the ratio of girls to boys?  2 : 1 B. What does this ratio mean? For every 2 girls, there is 1 boy.

3. I can determine Equivalent Ratios by Scaling up or down.

Scaling up: multiplying numerator and denominator by the same factor
Scaling down: dividing numerator and denominator by the same factor.

$$\frac{\text{problems correct}}{\text{minutes}} \rightarrow \frac{4}{5} \underset{\times 4}{\overset{\times 4}{=}} \frac{\boxed{16}}{20}$$

Find the missing values:

$$\frac{\text{2 blueberry muffins}}{\text{5 total muffins}} = \frac{\text{50 blueberry muffins}}{\text{? total muffins}}$$

$$\frac{2\times 25}{5\times 25} = \frac{50}{\boxed{125}}$$

$$\frac{\text{20 hours of work}}{\$240} = \frac{\text{1 hour of work}}{?}$$

$$\frac{20\div 20}{240\div 20} = \frac{1}{\boxed{12}}$$

4. I can determine Equivalent Ratios using a table.

Ratio tables are helpful when solving word problems or if you are given a table with missing values. Think about how you can use number operations to go from each spot to another in a table. You also need to realize that each column in the table represents a ratio and they are all equivalent (hence, you can also use a proportion to find the missing numbers).

	÷4	÷2	×2

Yellow paint (oz)	2	4	8	16
Blue paint (oz)	4	8	16	32

A. Every 2 boxes of fruit snacks will serve 11 students. How many boxes can serve 22 and 33 students?

Boxes	2	4	6
Students	11	22	33

$\frac{2}{11} = \frac{x}{22}$ $\frac{11x}{11} = \frac{44}{11}$ $x = 4$

$\frac{2}{11} = \frac{x}{33}$ $\frac{11x}{11} = \frac{66}{11}$ $x = 6$

B. Each group of 5 children needs to use two soccer balls. How many soccer groups are needed for 20 and 25 groups of kids?

Soccer balls	2	8	10
Children	5	20	25

$\frac{2}{5} = \frac{x}{20}$ $\frac{5x}{5} = \frac{40}{5}$ $x=8$

$\frac{2}{5} = \frac{x}{25}$ $\frac{5x}{5} = \frac{50}{5}$ $x=10$

5. I can create and solve Proportions.

11 + 5 = 16

When solving proportions, you can scale up or down OR cross multiply. You should LABEL everything in a proportion.	A. in a grade level, the number of boys to number of girls is 11:5. If there are 30 girls, how many students are there total? girls : students $\frac{5}{16} = \frac{30}{x}$ $\frac{5x}{5} = \frac{480}{5}$ $x = 96$ students
Sometimes, it is best to create your part to part ratio plus the two part to whole ratios before solving to help ensure you solve what is asked of you (See I Can Statement #1).	B. For every 4 seniors, there are 9 freshmen. If there are 728 students total, how many of them are seniors? 4+9=13 Snrs : Students $\frac{4}{13} = \frac{x}{728}$ $\frac{13x}{13} = \frac{2912}{13}$ $x = 224$ seniors
	C. A city bus goes 18 miles in 30 minutes. How far does it go in 2 hours? = 120 minutes miles : minutes $\frac{18}{30} = \frac{x}{120}$ $\frac{30x}{30} = \frac{2160}{30}$

$\boxed{x = 72 \text{ miles}}$

6. I can determine a Unit Rate.

A unit rate is the rate for one unit of a given quantity which means they have a denominator of one.

Example: Sarah reads 88 pages in 4 hours. How many does she read in an hour?

$$\frac{88 \text{ pages}}{4 \text{ hours}} = \frac{22 \text{ pages}}{1 \text{ hour}}$$

Unit rates are also useful for determining better buys (which is cheaper per unit?).

Example: Is a 12 oz bag of chocolate chips for $4 a better deal than an 18 oz bag of chocolate chips for $4.89?

$\frac{\$4.00}{12\text{-oz}} \Rightarrow$ 12 ÷ 4 = $0.33 per ounce

$\frac{\$5.50}{18\text{-oz}} \Rightarrow$ 5.50 ÷18 = $0.31 per ounce ---BETTER DEAL!

A. Austin travels 455 miles in 9 hours. How far did he go in one hour?

$\frac{\text{miles}}{\text{hrs}} : \frac{455}{9} = \frac{x}{1}$

$\frac{9x}{9} = \frac{455}{9}$ $\boxed{x = 50.6 \text{ miles}}$

B. Candy canes cost $1.50 for a dozen (12) candy canes at Christmas time. How much is one candy cane?

$\frac{\$}{\text{Candy}} : \frac{1.50}{12} = \frac{x}{1}$

$\frac{12x}{12} = \frac{1.50}{12}$ $\boxed{\$0.13 \text{ cents}}$

C. Which is the better deal?

a) *12 oz bottle of Diet Coke for $1.09.*

b) *20 oz bottle of Diet Coke for $1.99.*

a) $\frac{\$1.09}{12} = \$0.09 \text{ cents}$

b) $\frac{\$1.99}{20} = 0.0995$

$\approx \$0.10 \text{ cents}$

a) is the better deal.

7. I can determine the Constant of Proportionality (Unit Rate) from a Table

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Table:

- The constant of proportionality is $\frac{y}{x}$. This value must be the same in the table.

Equation

- The equation of a proportional relationship must be in the form of $y = kx$
- Example: $C = 7n$
The constant of proportionality is the coefficient of n which is 7.

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The following table shows the amount of chocolate, in pounds and the price paid.

Chocolate in pounds (x)	2	3	4
Cost in dollars (y)	9	13.50	18

a) What is the constant of proportionality?

$k = \frac{y}{x} = \frac{9}{2} = 4.5$

B) Write an equation to express the relationship between the amount of chocolate and the price paid.

$y = 4.5x$

c) What is the maximum amount of chocolate you can buy with $72.00?

$\frac{72}{4.50} = 16$

You can buy a maximum of 16 chocolates.

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8. I can determine a Unit Rate from a Graph.

Each point on the graph represents a ratio that is equivalent to another ratio (point) on the graph.

The unit rate on a graph is the slope of the line.

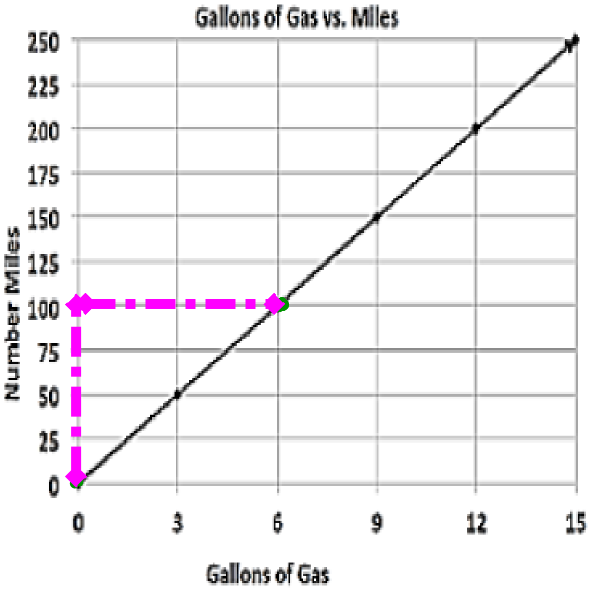
When calculating the unit rate, it is the y-value over the x-value (rise over run). $\frac{rise}{run}$ or $\frac{change\ in\ y}{change\ in\ x}$

Unit rates should always be labeled.

A. Calculate the unit rate:

Unit rate (k) = $\frac{rise}{run} = \frac{100}{6}$

$\boxed{k = 16.7}$



9. I can compare different representations of Equivalent Ratios & Unit Rates.

To compare different representations of ratios, determine the unit rate.

Katie makes more per hour. She makes \$3 more per hour than Jill.

A. Jill and Katie have different part time jobs as shown below. Fill in the missing numbers and then determine how much they make per hour.

Jill:

Hours	2	4	6	8	10	12	14	16
Dollars	18	36	54	72	90	108	126	144

$K = \frac{18}{2} = 9$

$14 \times 9 = 126$

$16 \times 9 = 144$

Katie:

Hours	3	6	9	12	15	18	21	24
Dollars	36	72	108	144	180	216	252	288

Who makes more per hour? How much more per hour?

$21 \times 12 = 252$

$K = \frac{36}{3} = 12$

$6 \times 12 = 72$