

6th Grade CCA Unit #5: Ratios and Proportions

Resources: Big Ideas: Chapter 5

Common Core Standards: 7.RP.1; 7.RP.2a-d; 7.RP.3

Main Focus: Creating and solving proportions

Number	Learning Targets	Resources
1	I can find a ratio, rate, and unit rate.	5.1
2	I can determine whether two ratios form a proportion. (1 day)	5.2
3	I can write and solve simple proportions. (1 day)	5.3
4	I can write and solve complex proportions using cross products.	5.4
5	I can identify and interpret the constant of proportionality. (slope)	5.5
6	I can identify direct variation from equations and graphs.	5.6

My Practice:

Number	Pre-test:	Exit slip scores	Day #2 Homework	Extra Targeted Practice	Post-test:
1	_____/5				_____/7
2	_____/2				_____/4
3	_____/4				_____/7
4	_____/2				_____/5
5	_____/6				_____/6
6	_____/2				_____/4

My Final Pretest Score: _____ /21

My Final Pretest Percent _____ %

My Final Posttest Score: _____ /36

My Final Posttest Percent: _____ %

My percent of increase between the Pre and Post test scores = _____ !!

(1)

Unit 5: Ratios and Proportions Extended Homework

This homework is designed to expand your thinking and practice mathematical explanations.

You need to show an attempt on every problem as well as an explanation of your thinking.

You may use a calculator when applicable.

5.1 Ratios and Rates Extended Homework

Complete #30 (pg. 168) and #36 (pg. 169) from the online textbook from section 5.1

30.)	36.)
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5.2 Proportions Extended Homework

Complete #22 (pg. 174) and #27 (pg. 175) from the online textbook from section 5.2

22.)	27.)
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5.3 Writing Proportions Extended Homework

Complete #8 (pg. 182) and #22 (pg. 183) from the online textbook from section 5.3

8.)	22.)
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5.4 Solving Proportions Extended Homework

Complete #24 (pg. 190) and #34 (pg. 191) from the online textbook from section 5.4

24.)	34.)
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5.5 Slope Extended Homework

Complete #16 (pg. 197) and #17 (pg. 197) from the online textbook from section 5.5

16.)	17.)
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5.6 Direct Variation Extended Homework

Complete #19 (pg. 202) and #26 (pg. 203) from the online textbook from section 5.6

19.)	26.)
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Section 5.1: Ratios, Rates, and Unit Rates Student Notes

POD:

Simplify the fractions

1) $\frac{9}{45}$

2) $\frac{16}{64}$

3) $\frac{45}{60}$

Objective: To find ratios, rates, and unit rates

Vocabulary:

- 1.) Ratio - a comparison of 2 quantities (numbers) by division
- 2.) Rate - is a ratio of two quantities with different units (miles and hours)
- 3.) Unit Rate - A rate with the denominator of 1

How to Write a Ratio:

- | | | | |
|--------------------------|---------------|---|--|
| 1.) Using a fraction bar | $\frac{2}{3}$ | } | All three ways are read the same
"two to three" |
| 2.) Using a colon | 2 : 3 | | |
| 3.) Using the word "to" | 2 to 3 | | |

Write Ratios and Find Unit Rates

1.) There are 12 boys and 20 girls in Mr. Luczak's math class. Write the ratio of boys to girls in three ways.

2.) If you drive 183 miles in 3 hours. What is the unit rate (per hour rate)?
61 miles per hour

Finding a Rate from a Ratio Table.

Servings per package

Packages	3	6	9	12	Rate _____
Servings	13.5	27	40.5	54	Unit Rate _____

Cost Per Notebook

Notebooks	0	5	10	15	Rate _____
Cost (dollars)	0	9.45	18.90	28.35	Unit Rate _____

Solving a Ratio Problem

You mix a ratio of $\frac{1}{4}$ cup of juice concentrate for every 2 cups of water. How much juice concentrate do you use to make 18 cups of juice?

HINT: Make a ratio table

Juice Concentrate	Water	Cups of Juice

5.1 Ratios and Rates Homework Day #1

Write the ratio as a fraction in simplest form.

1. 12 to 15 2. 24 : 9 3. 14 tetras : 6 angelfish

Find the unit rate.

4. 360 miles in 6 hours 5. 18 bowlers on 6 lanes 6. \$28 for 7 people

Use the ratio table to find the unit rate with respect to the specified units.

7. Laps per minute

Minutes	0	2	4	6
Laps	0	1	2	3

8. Grams of protein per serving

Servings	0	1	2	3
Grams of Protein	0	15	30	45

9. There are 234 students in 9 different classrooms. What is the ratio of students to classrooms?
10. Dishwasher detergent is sold in individual packs. It is sold in 20-, 60-, and 90-pack containers.
- The 20-pack container sells for \$5.49. What is the unit rate in dollars per pack? Round your answer to the nearest cent.
 - The 60-pack container sells for \$10.97. What is the unit rate in dollars per pack? Round your answer to the nearest cent.
 - The 90-pack container sells for \$18.95. What is the unit rate in dollars per pack? Round your answer to the nearest cent.

5.1

Ratios and Rates Homework Day #2

Write the ratio as a fraction in simplest form.

1. 35 to 63
2. 10.8 seconds : 36 feet
3. 26.1 miles : 3.6 hours
4. 12 completions to 28 attempts

Find the unit rate.

5. \$5.40 for 24 cans
6. \$1.29 for 20 ounces
7. 50 meters in 27.5 seconds

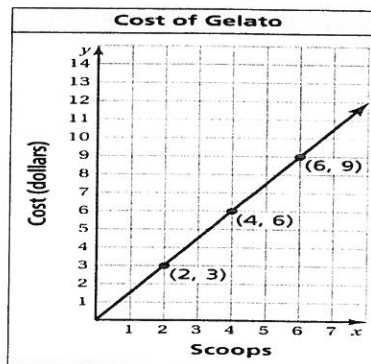
8. The table shows nutritional information for three energy bars.

- a. Which has the most protein per calorie?
- b. Which has the least sugar per calorie?
- c. Which has the highest rate of sugar to fiber?

Energy Bar	Calories	Protein	Fiber	Sugar
A	220	20 g	12 g	14 g
B	130	12 g	8 g	10 g
C	140	4 g	9 g	9 g

9. The graph shows the cost of buying scoops of gelato.

- a. What does the point (4, 6) represent?
- b. What is the unit cost?
- c. What is the cost of 12 scoops?



10.) Paige sold 64 tickets to the school play and Elesia sold 48.

- a.) Write the ratio of the number of tickets Paige sold to the total number of tickets sold. Write the ratio in simplest form.

10a.) _____

- b.) Write the ratio of the number of tickets Elesia sold to the number of tickets Paige sold. Write the ratio in simplest form.

10b.) _____

Section 5.2: Solving Proportions Student Notes (ONE DAY LESSON)

POD:

1.) If you bought 24 oranges for \$6 what is the unit price per orange?

2.) If you earned \$45 for 3 hours of work, what is the unit rate?

Objective: To test whether ratios form a proportion. To solve proportions using unit rates, mental math, and cross products.

Vocabulary:

1.) Proportion - an equation stating that two ratios are equal (i.e. $\frac{2}{4} = \frac{1}{2}$)

2.) Cross Products - Multiply diagonally to see if the proportions are equal.

We use can cross products to determine if two ratios form a proportion.

How to Determine if Two Ratios are a Proportion:

1.) Write the ratios as a proportion.

2.) Find the cross products. If they are:

a. Equal then they are a proportion

b. Not Equal then they are not a proportion

Examples:

Determine if each pair of ratios form a proportion.

1.) $\frac{3}{8}, \frac{9}{24}$

2.) $\frac{8}{12}, \frac{6}{24}$

3.) You swim the first laps in a swimming pool in 2.4 minutes. You complete 16 laps in 12 minutes. Is the number of laps proportional to your time?

4.) Tell whether x and y are proportional. Compare each ratio x to y in simplest form.

x	y
$\frac{1}{2}$	3
1	6
$\frac{3}{2}$	9
2	12

5.2 Proportions Day #1 Homework (Only one day)

Tell whether the ratios form a proportion. Justify all of your answers

1. $\frac{1}{4}, \frac{3}{12}$

2. $\frac{1}{7}, \frac{4}{28}$

3. $\frac{2}{5}, \frac{30}{80}$

4. $\frac{15}{21}, \frac{40}{56}$

5. $\frac{33}{63}, \frac{26}{42}$

6. $\frac{54}{10}, \frac{81}{15}$

Tell whether the two rates form a proportion.

7. 8 feet in 15 seconds; 16 feet in 40 seconds 8. 28 people in 4 rooms; 63 people in 9 rooms
9. 14 girls to 6 boys; 35 girls to 15 boys 10. 45 marbles in 9 bags; 150 marbles in 36 bags
11. You can run 4 laps in 10 minutes. Your friend can run 6 laps in 15 minutes. Are these rates proportional? Explain.
12. You get \$27 to spend at the mall for doing 6 chores. Your friend gets \$36 for doing 8 chores.
- a. What is your pay rate?
- b. What is your friend's pay rate?
- c. Are the pay rates equivalent? Explain.
13. You can buy 4 tickets for \$75 or 5 tickets for \$94. Are the costs proportional? If not, rewrite one of the rates so the costs are proportional.
14. A specific shade of red nail polish requires 7 parts red to 2 parts yellow. A mixture contains 35 quarts of red and 8 quarts of yellow. How can you fix the mixture to make the correct shade of red?

Section 5.3: Writing and Solving Proportions Student Notes (ONE DAY)

POD:

Tell whether x and y are proportional. Show your work

x	1	2	3	4
y	7	8	9	10

Objective: To write and solve proportions using cross products.

Vocabulary:

1.) Proportion - an equation stating that two ratios are equal (i.e. $\frac{2}{4} = \frac{1}{2}$)

2.) Cross Products - Multiply diagonally to see if the proportions are equal.

We use can cross products to determine if two ratios form a proportion.

How to Solve a Proportion:

1.) Set up proportions (make sure the units correspond with one another)

2.) Multiply using cross products.

3.) Solve the equation by dividing.

Examples:

1.) $\frac{x}{8} = \frac{14}{4}$	2.) $\frac{14}{6} = \frac{x}{15}$
3.) Write and Solve. How many points will a student need to earn on a test to get the given score. A test worth 80 points; a score of 95%	4.) Write and Solve. How many points will a student need to earn on a test to get the given score. A test worth 40 points; a score of 80%

Word Problems

5.) A recipe requires the ratio of sugar to flour to be 8 : 18.

A bowl of this recipe has 16 cups of sugar. How many cups a flour are in the bowl?

6.) The ratio of water to oil in a muffin recipe is 3:4. The recipe uses 21 ounces of liquid (water and oil). How many ounces of the mix is water and how many ounces are oil?

5.3**Writing Proportions Homework Day #1 (One day)**

Write and solve a proportion to find how many points a student needs to earn on the test to get the given score.

1. test worth 70 points; test score of 90% 2. test worth 30 points; test score of 70%

3. The ratio of brown sugar to white sugar in a cookie recipe is 2 : 3. You are making a big batch of cookies and are using 15 cups of sugar altogether. How much of each sugar is needed?

4. The county requires 2 teachers for every 45 students. Write and solve a proportion that gives the number t of teachers needed for 315 students.

Solve the proportion.

5. $\frac{2}{3} = \frac{a}{15}$

6. $\frac{4}{7} = \frac{44}{m}$

7. $\frac{d}{6} = \frac{72}{48}$

8. A paint color requires the ratio of green paint to yellow paint to be 4 : 9.
- A container of this paint has 36 pints of yellow paint. Write a proportion that gives the number g of pints of green paint in the container.
 - How many pints of green paint are in the container?
 - How many *gallons* of paint are in the container altogether?

Section 5.4: Complex Proportions and Graphs Student Notes

POD:

$$1.) \frac{x}{8} = \frac{14}{4}$$

$$2.) \frac{40}{50} = \frac{x}{80}$$

Objective: To use ratios and cross products to solve complex proportions and interpret graphs.

Steps for solving proportions:

1. Set up the proportions.
2. Solve using cross products.
3. Make sure to distribute if necessary!!

Examples: Solve each proportion.

1.) Macy has a recipe that requires 5 eggs, $\frac{3}{4}$ cup of flour, and $\frac{1}{2}$ cup of pudding. If Macy only has 3 eggs, how much flour will she need?

$$2.) \frac{3}{16} = \frac{24}{5x+1}$$

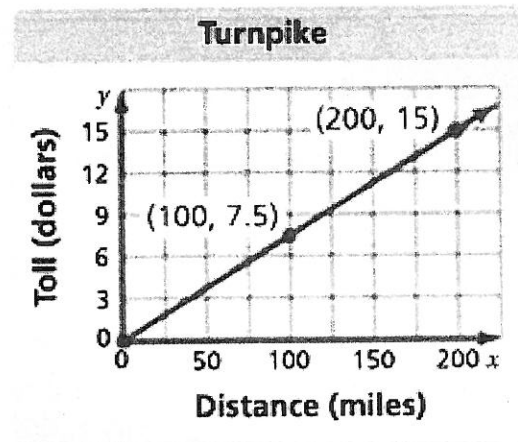
$$3.) \frac{5}{3x} = \frac{2}{20}$$

$$4.) \frac{x+3}{14} = \frac{20}{5}$$

$$5.) \frac{2x-5}{18} = \frac{22}{15}$$

The graph shows the toll y due on a turnpike for driving x miles. Your toll is \$7.50. How many *kilometers* did you drive?

The point $(100, 7.5)$ on the graph shows that the toll is \$7.50 for driving 100 miles. Convert 100 miles to kilometers.



5.4 Complex Proportions Day #1 Homework

Use the Cross Products Property to solve the proportion.

1. $\frac{x+6}{24} = \frac{4}{5}$

2. $\frac{3}{19} = \frac{111}{-2j}$

3. $\frac{x+5}{12} = \frac{3}{-4}$

4. Does $\frac{x}{4} = \frac{15}{3}$ have the same solution as $\frac{x}{15} = \frac{4}{3}$? Explain your reasoning.

5. It costs \$270 for 3 people to go on a fishing trip. How much does it cost for 10 people to go on the fishing trip?

Solve the proportion.

6. $\frac{3x}{10} = \frac{9}{4}$

7. $\frac{5x}{3} = \frac{80}{12}$

8. $\frac{7}{2} = \frac{x+1}{6}$

9. Tell whether the statement is *true* or *false*. **Explain.**

If $\frac{p}{q} = \frac{3}{5}$, then $\frac{5}{p} = \frac{3}{q}$.

5.4 Complex Proportions Day #2 Homework

Use the Cross Products Property to solve the proportion. Round to the nearest tenth if necessary.

1. $\frac{4}{32} = \frac{g-6}{62}$

2. $\frac{x+6}{42} = \frac{25}{7}$

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

4. There are 144 people in an audience. The ratio of adults to children is 5 to 3. How many are adults?

Solve the proportion.

5. $\frac{8x}{13} = \frac{64}{52}$

6. $\frac{c-3}{6} = \frac{7}{3}$

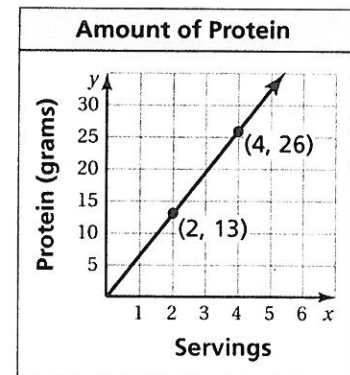
7. $\frac{20}{9} = \frac{10}{s+2}$

8. The number of grams of protein is proportional to the number of servings.
(show all work)

a. How many servings provide 32.5 grams of protein?

b. Use a different method than part (a) to find how many servings provide 52 grams of protein.

c. How many grams of protein will 7 servings provide?



d. If 1 serving is equal to $\frac{3}{4}$ cup, how many cups does it take to get 19.5 grams of protein?

9. One day 176 people visited a small art museum. The ratio of members to nonmembers that day was 5 to 11. How many people who visited the museum that day were nonmembers?

Section 5.5: Constant of Proportionality Student Notes

POD: Solve.

1.) $\frac{2x}{5} = \frac{6}{8}$

2.) $\frac{x+1}{4} = \frac{4}{8}$

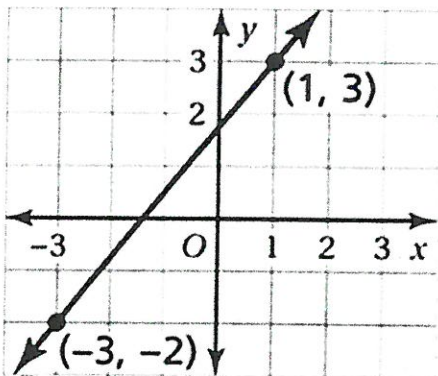
Objective: Students will be able to determine if a relationship is a proportion. Students will be able to determine and explain the constant of proportionality from a relationship.

Vocabulary

- 1.) Constant of Proportionality - the _____ of a set of data (constant = k)
- 2.) Constant of Proportionality Equation: $y = kx$, where $k = \frac{y}{x}$, (x, y) are coordinates on the graph
- 3.) Slope: the rate of change between any two points on a line. Slope =

Finding Slopes:

What is the slope of this line?



How to Determine if a Relationship is Proportional from a TABLE:

- 1.) Find the constant of proportionality - Unit Rate!!! Remember your units!
- 2.) If the constant IS the same for each value in the table, then it IS a proportional relationship
- 3.) If the constant is NOT the same for each value in the table, then it is NOT a proportional relationship.

Examples

Determine if each table represents a proportional relationship. If so, determine the constant of proportionality.

1.) Below is a table for the price of books at a local bookstore.

Books	\$	Constant
1	3	
3	9	
4	12	
7	18	

Is the relationship proportional? Why or why not?

2.) Below is a table for the number of seed packets to make a plant.

<u>Number of Seed Packets</u>	<u>Total Number of Plants</u>	<u>Constant</u>
1	10	
2	20	
3	30	
4	40	

2a.) Is the relationship proportional? Why or why not?

2b.) How many plants would 8 seed packets grow?

2c.) How many seed packets would make 90 plants?

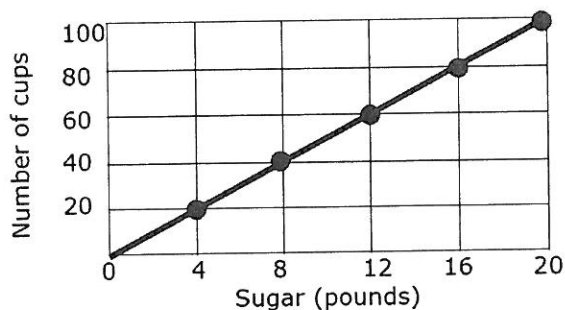
How to Determine if a Relationship is Proportional from a GRAPH:

- 1.) If the graph makes a straight line, then the relationship IS proportional
- 2.) If the graph does NOT make a straight line, then the relationship is NOT proportional

Examples

Determine if each graph makes a proportional relationship. If it does, find the constant of proportionality.

1.) The graph below represents the total number of cups of coffee and the total amount of pounds of sugar to make the coffee.



1a.) Is the relationship proportional?

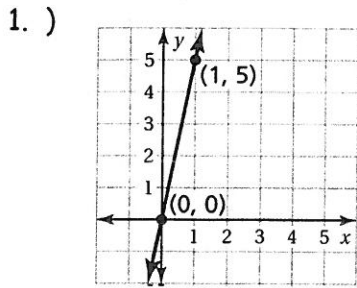
1b.) What is the constant of proportionality?

1c.) Write an equation to represent the relationship.

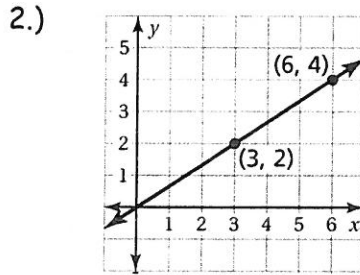
1d.) Find the number of cups of coffee you can make with 10 pounds of sugar.

Section 5.5: Constant of Proportionality Homework Day #1

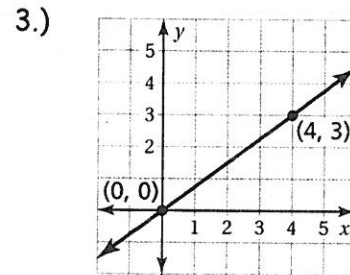
Find the slope of the line.



Slope = _____



Slope = _____



Slope = _____

Determine if the relationship from the table is a proportional relationship. If so, find the constant of variation.

4.)

<u>Gallons</u>	<u>Mile</u>
2.5	50
5	100
7.5	150
12.5	

Is the relationship proportional? Yes No

Constant: _____

5.)

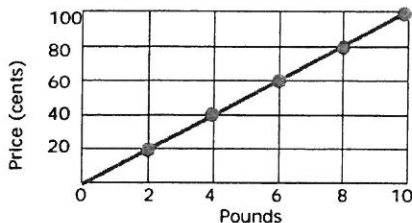
<u>Days</u>	<u>Hours of Homework</u>
1	4
2	6
3	9

Is the relationship proportional? Yes No

Constant: _____

Determine the constant of proportionality from the graph. Then write an equation.

6.) The graph shows the relationship of the price of pounds of strawberries at a store when they are on a super sale.



Constant: _____ Equation: _____

How much will 7 pounds of strawberries cost?

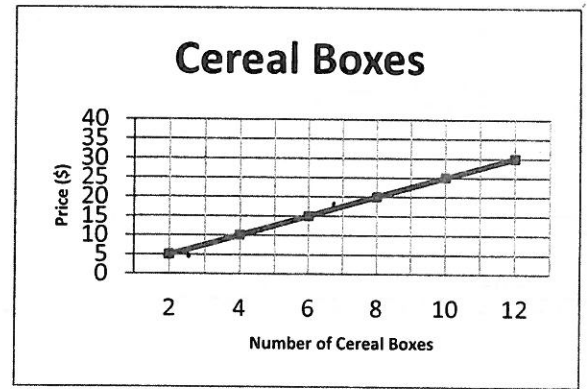
What does the point (8, 80) mean in the context of this graph?

7.) Jasmine went to the store to buy cereal boxes.

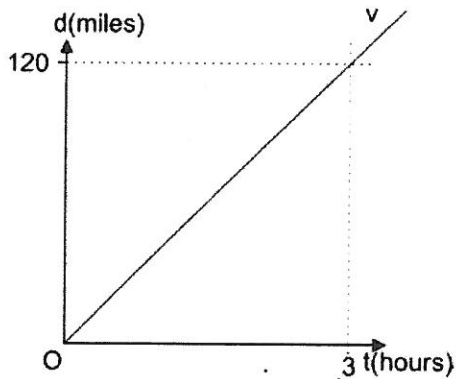
Constant: _____

Equation: _____

How much money does she need to buy 15 cereal boxes?



8.) Line v in the coordinate graph below represents the distance in time travelled by a vehicle. What is the distance travelled after 75 minutes?



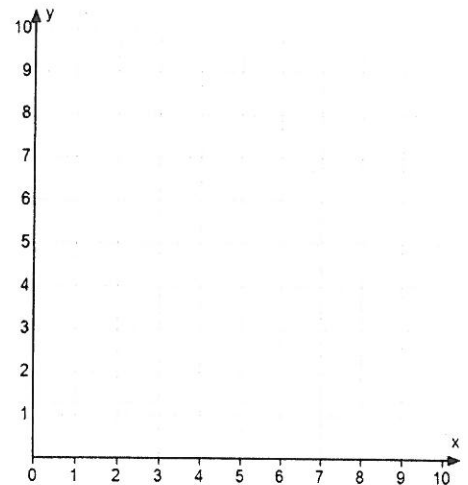
Constant: _____ Equation: _____

Distance traveled after 75 minutes? _____

9.) Graph the following table.

People	Cookies Eaten
2	6
4	12
6	18
8	24

Constant: _____ Equation: _____



How many people would there be if 16 people were eating cookies?

Section 5.5: Constant of Proportionality: Homework Day #2

Find the constant of proportionality from the table.

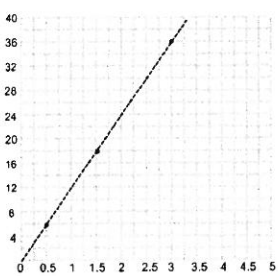
Example	x	y
	7.5	4.5
	10	6
	17.5	10.5
	20	12

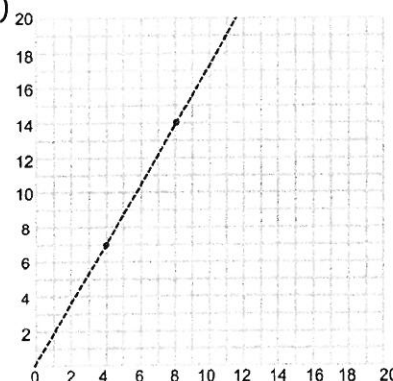
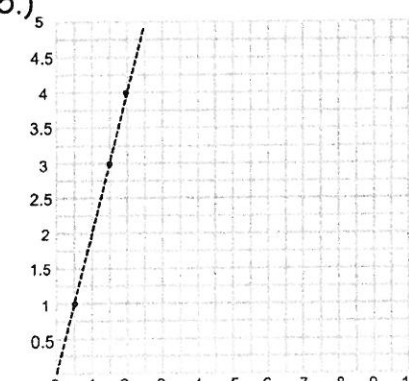
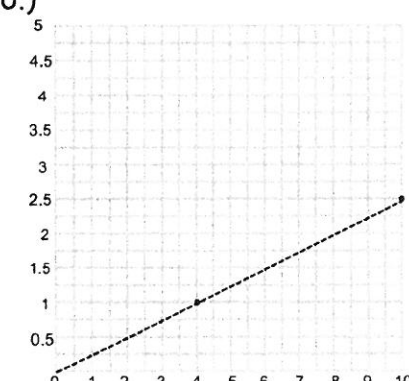
To find the constant:
 Find $\frac{y}{x} = \frac{4.5}{7.5} = 0.6 = \text{Constant}$

To write the equation:
 Fill in the constant for k in the formula $y = kx$
 $y = 0.6x$

<p>1.)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th style="text-align: center;">x</th><th style="text-align: center;">y</th></tr> <tr><td style="text-align: center;">2</td><td style="text-align: center;">8</td></tr> <tr><td style="text-align: center;">3</td><td style="text-align: center;">12</td></tr> <tr><td style="text-align: center;">5</td><td style="text-align: center;">20</td></tr> <tr><td style="text-align: center;">6</td><td style="text-align: center;">24</td></tr> </table> <p>Constant: _____</p> <p>Equation: _____</p>	x	y	2	8	3	12	5	20	6	24	<p>2.)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th style="text-align: center;">x</th><th style="text-align: center;">y</th></tr> <tr><td style="text-align: center;">1</td><td style="text-align: center;">2</td></tr> <tr><td style="text-align: center;">2</td><td style="text-align: center;">4</td></tr> <tr><td style="text-align: center;">2.5</td><td style="text-align: center;">5</td></tr> <tr><td style="text-align: center;">3.5</td><td style="text-align: center;">7</td></tr> </table> <p>Constant: _____</p> <p>Equation: _____</p>	x	y	1	2	2	4	2.5	5	3.5	7	<p>3.)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th style="text-align: center;">x</th><th style="text-align: center;">y</th></tr> <tr><td style="text-align: center;">1.5</td><td style="text-align: center;">1</td></tr> <tr><td style="text-align: center;">3</td><td style="text-align: center;">2</td></tr> <tr><td style="text-align: center;">4.5</td><td style="text-align: center;">3</td></tr> <tr><td style="text-align: center;">12</td><td style="text-align: center;">8</td></tr> </table> <p>Constant: _____</p> <p>Equation: _____</p>	x	y	1.5	1	3	2	4.5	3	12	8
x	y																															
2	8																															
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1	2																															
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3.5	7																															
x	y																															
1.5	1																															
3	2																															
4.5	3																															
12	8																															

Find the constant of proportionality from the graph.

<p>Example</p> 	<p>To find the constant: Pick a coordinate on the graph: (0.5, 6)</p> <p>Find $\frac{y}{x} = \frac{6}{0.5} = 12 = \text{Constant}$</p> <p>To find the equation: Fill in the constant for k in the formula $y = kx$ $y = 12x$</p>
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<p>4.)</p>  <p>Constant: _____</p> <p>Equation: _____</p>	<p>5.)</p>  <p>Constant: _____</p> <p>Equation: _____</p>	<p>6.)</p>  <p>Constant: _____</p> <p>Equation: _____</p>
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Find the constant of proportionality from the word problem.

Example

Mrs. Kunkel drove at a steady rate for 40 minutes. She drove 30 miles during that time.

What is the constant of proportionality between the number of miles and number of minutes she drove.

To find the constant:

Determine which units are y and which are x from the problem:

What is the constant of proportionality between the number of miles (y) and number of minutes(x) she drove.

$$\text{Find } \frac{y}{x} = \frac{\text{miles}}{\text{min}} = \frac{30}{40} = 0.75 \text{ miles/minute} = k$$

To find the equation:

Fill in the constant for k in the formula $y = kx$

$$y = 0.75x$$

7.) There are 70 students on a field trip and 15 teachers. What is the constant of proportionality between the number of students and teachers?

Constant: _____

Equation: _____

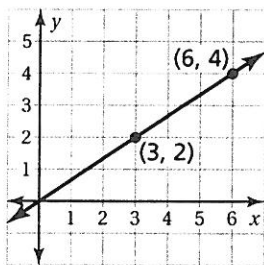
8.) Ming was planning a trip to Western Samoa. She knows that the exchange rate for 6 Tala is \$2. What is the constant of proportionality between Tala and US dollars?

Constant: _____

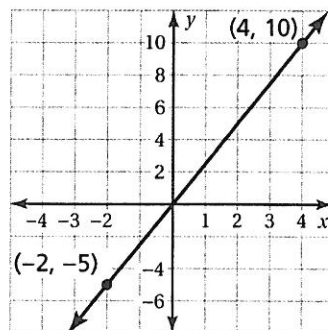
Equation: _____

Find the slope of each line.

9.)



10.)

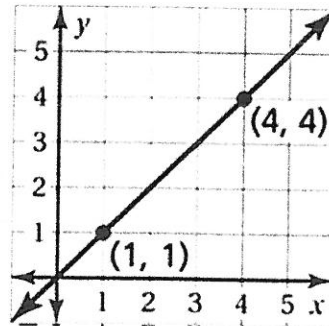
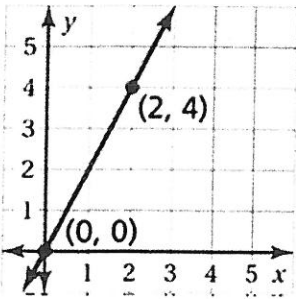


Section 5.6: Direct Variation Student Notes

POD:

1.) Find the slope of the line =

2.) Find the slope of the line =



Vocabulary:

Direct Variation: When $y = kx$ (also known as $y = mx$). k is a number and it cannot equal zero.

Example of Direct Variation: $y = 3x$ or $y = \frac{1}{2}x$

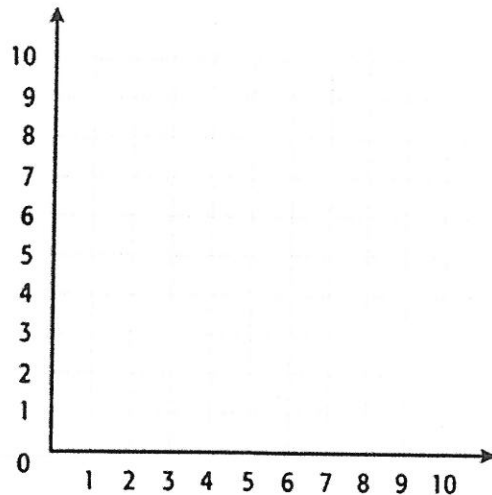
Constant of Proportionality: k is the constant of proportionality. When you graph the equation $y = kx$, the points must form a straight line AND the line MUST pass through the point of origin in order for x and y to be in DIRECT VARIATION.

1a.) Plot the points:

x	0	1	2	3
y	0	3	6	9

1b.) Does the graph show direct variation?

1c.) Write the equation:



Tell whether x and y show direct variation (remember: $y = kx$)

2.) $y + 1 = 2x$ (SOLVE FOR y first)

Is this direct variation? Yes or No
Why?

3.) $\frac{1}{2}y = x$ (SOLVE for y first)

Is this direct variation? Yes or No
Why?

4.)

x	1	2	3	4
y	4	8	12	16

5.)

x	-2	-1	0	1
y	4	2	0	2

The variables x and y vary directly. Use the values to find the constant of proportionality and write an equation that relates x and y .

6.) $y = 6; x = 3$

7.) $y = 4; x = 6$

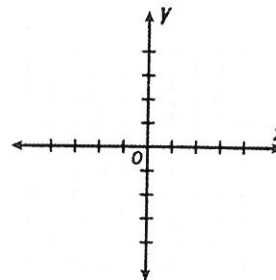
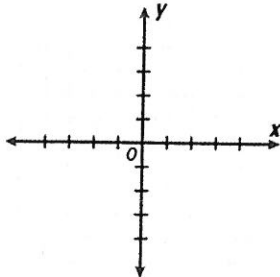
5.6

Direct Variation Homework Day #1

Graph the ordered pairs in a coordinate plane. Do you think that graph shows that the quantities vary directly? Explain your reasoning.

1. $(-2, -2), (0, 0), (2, 2), (4, 4)$

2. $(-1, -4), (0, -1), (1, 2), (2, 5)$



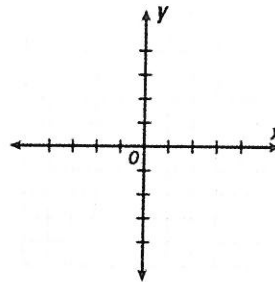
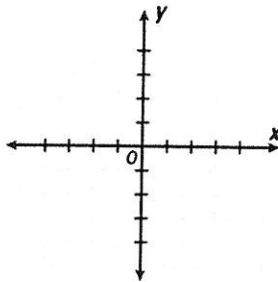
Tell whether x and y show direct variation. Explain your reasoning. If so, find k . (remember: graph the data first)

3.

x	-1	0	1	2
y	2	0	2	4

4.

x	2	4	6	8
y	1	2	3	4



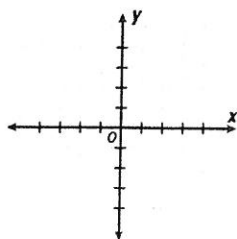
Tell whether x and y show direct variation. Explain your reasoning. If so, find k . (Remember: solve for y first, then determine if x and y show direct variation)

5. $y - 2 = 3x - 2$

6. $y + 3 = x$

7. $xy = 5$

8. The table shows the grams of fiber y for the grams of protein x . Graph the data. Tell whether x and y show direct variation. If so, write an equation that represents the line.



Grams of protein, x	3	6	9	12
Grams of fiber, y	2	4	6	8

5.6 Direct Variation Homework Day #2

Tell whether x and y show direct variation. Explain your reasoning. If so, find k .

1.

x	1	2	3	4
y	3	6	9	12

2.

x	-1	0	1	2
y	1	3	7	13

3.

x	0	2	4	6
y	8	5	2	-1

4. $y + 2 = x$

5. $\frac{1}{3}y = x$

The variables x and y vary directly. Use the values to find the constant of proportionality and write an equation that relates x and y .

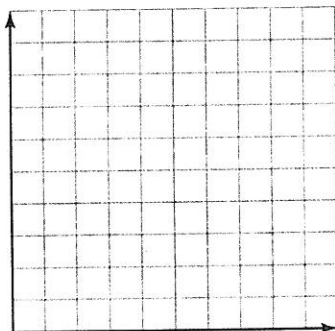
6. $y = 8; x = 2$

7. $y = 14, x = 16$

8. $y = 25, x = 35$

9. The table shows the cups c of dog food needed to feed a dog that weighs p pounds. Graph the data. Tell whether p and c show direct variation. If so, write an equation that represents the line.

Pounds, p	10	20	40	70
Food, c	$\frac{3}{4}$	$1\frac{1}{4}$	2	$2\frac{3}{4}$



10. The percent y of correct answers on a test varies directly with the points x earned on the test.

Points earned, x	?	48	?	64	72	?
Percent, y	50	60	70	80	90	100

a. Complete the table.

b. Write an equation that relates x and y .

Unit 5: Ratios Homework Answer Keys:

5.1 Day 1:

1. $\frac{4}{5}$	2. $\frac{8}{3}$	3. $\frac{7}{3}$	4. 60 mi/h	5. 3 bowlers per lane	6. \$4 per person
7. $\frac{1 \text{ lap}}{2 \text{ min}}$, or 0.5 lap per min			8. 15 grams per serving		9. 26 students per classroom
10. a. \$0.27 per pack b. \$0.18 per pack. c. \$0.21 per pack					

5.1 Day 2:

1. $\frac{5}{9}$	2. $\frac{3}{10}$	3. $\frac{29}{4}$	4. $\frac{3}{7}$	5. \$0.23 per can	6. \$0.06 per oz	7. about 1.82 m/sec
8. a. B b. A c. B			9. a. \$6 for 4 scoops b. \$1.50 per scoop c. \$18			10a. $\frac{4}{7}$ 10b. $\frac{3}{4}$

5.2:

1. yes	2. yes	3. no	4. yes	5. no	6. yes	7. no	8. yes	9. yes	10. no
11. yes; <i>Sample:</i> Each unit rate is equivalent to 2.5 minutes per lap.								12a. \$4.50 per chore	
12b. \$4.50 per chore		12c. yes; Rates are equivalent.			13. no; 5 tickets for \$93.75 or 4 tickets for \$75.20				
14. Add two quarts yellow.									

5.3:

1. 63 points	2. 21 points	3. 6 cups brown sugar; 9 cups white sugar	4. 14 teachers
5. $a = 10$	6. $m = 77$	7. $d = 9$	8. a. $\frac{4}{9} = \frac{g}{36}$ b. 16 pints c. $6\frac{1}{2}$ gallons (52 pints)

5.4 Day 1:

1. $x = 13.2$	2. $j = -351.5$	3. $x = -14$	4. yes, when you cross multiply, you still get the same products		
5. \$900	6. $x = 7.5$	7. $x = 4$	8. $x = 20$	9. false, Cross products are $3q = 5p$; not $3p = 5q$	

5.4 Day 2:

1. $g = 13.75$	2. $x = 144$	3. $n = 2.3$	4. 90 adults	5. $x = 2$	6. $c = 17$	7. $s = 2.5$	8 a. 5 servings
8 b. 8 servings		8 c. 45.5 g		8 d. $2\frac{1}{4}c$		9. 121 nonmembers	

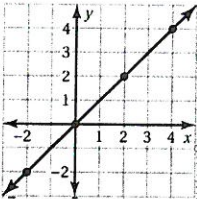
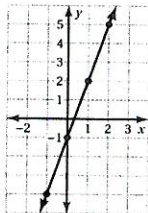
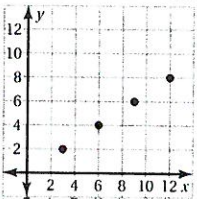
5.5 Day 1:

1.) $\frac{5}{1}$ (5)	2.) $\frac{2}{3}$	3.) $\frac{3}{4}$	4.) Yes; Constant = 20; Missing Table Value = 250
5.) No; Constant = None		6.) Constant = 10; Equation: $y = 10x$; 70 Cents; 8 pounds for 80 cents	
7.) Constant = 2.5; Equation: $y = 2.5x$; \$37.50		8.) Constant = 40; Equation: $y = 40x$; 50 miles	
9.) Constant = 3; Equation: $y = 3x$; 48 cookies			

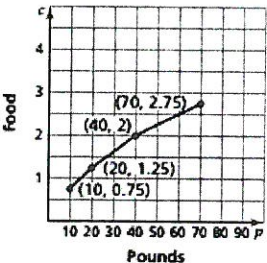
5.5 Day 2:

1.) 4; $y = 4x$	2.) 2; $y = 2x$	3.) $\frac{2}{3}$; $y = \frac{2}{3}x$	4.) $\frac{7}{4}$; $y = \frac{7}{4}x$	5.) 2; $y = 2x$	6.) $\frac{1}{4}$; $y = \frac{1}{4}x$
7.) $\frac{14}{3}$; $y = \frac{14}{3}x$	8.) 3; $y = 3x$	9.) $\frac{2}{3}$	10.) $\frac{5}{2}$		

5.6 Day 1:

1. yes; The line through the plotted points passes through the origin. 	2. no; The line through the plotted points does not pass through the origin. 
3. no; The plotted points do not lie on a line.	4. yes; The line through the plotted points passes through the origin; $k = \frac{1}{2}$
5. yes; The equation can be written as $y = kx$; $k = 3$	6. no; The equation cannot be written as $y = kx$.
7. no; The equation cannot be written as $y = kx$.	8. yes; $y = \frac{2}{3}x$ 

5.6 Day 2:

1.) yes, the line is in the form $y = kx$	2.) No, the line does not go through the origin.		
3.) No, the line does not go through the origin.	4.) No, The equation cannot be written as $y = kx$.		
5.) yes, the line is in the form $y = kx$	6.) $y = 4x$	7.) $y = \frac{7}{8}x$	8.) $y = \frac{5}{7}x$
9.)  No, p and c do not show direct variation.	10a.) points earned: 40, 48, 56, 64, 72, 80 b. $y = \frac{5}{4}x$ c. yes; The graph is a line through (0, 0).		