

6th Grade Math Unit 2-Ratios

Name: _____

Period: _____

Calendar:

Thursday, September 13th <ul style="list-style-type: none"> Focus: Ratios IXL Topic: R.1, R.2 	Friday, September 14th <ul style="list-style-type: none"> Focus: Ratios IXL Topic: R.1, R.2 	Monday, September 17th <ul style="list-style-type: none"> Focus: Unit Rate IXL Topic: R.7, R.9
Tuesday, September 18th <ul style="list-style-type: none"> Focus: Unit Rate IXL Topic: R.7, R.9 <p>(Ms. Rankin will not be at EPMS today due to meeting)</p>	Wednesday, September 19th <ul style="list-style-type: none"> Focus: Ratio Tables IXL Topic: R.5 	Thursday, September 20th <ul style="list-style-type: none"> Focus: Ratio Tables/ Review IXL Topics: R.1, R.2, R.5, R.7, R.9
Friday, September 21st <ul style="list-style-type: none"> Quiz <ul style="list-style-type: none"> Ratios Unit Rate Ratio Tables 	Monday, September 24th <ul style="list-style-type: none"> Focus: Graphing Basics IXL Topic: X.1, X.2 	Tuesday, September 25th <ul style="list-style-type: none"> Focus: Graphing Ratio Tables IXL Topic: R.5
Wednesday, September 26th <ul style="list-style-type: none"> Focus: Equivalent Ratios IXL Topic: R.3, R.4, R.6 	Thursday, September 27th <ul style="list-style-type: none"> Focus: Word Problems/Proportions IXL Topic: R.10, R.11 	Friday, September 28th <ul style="list-style-type: none"> Focus: Review/ Catch Up Day IXL Topic: R.1, R.2, R.3, R.4 R.5, R.6 R.7, R.9, R.10, R.11, X.1, X.2
Monday, October 1st <ul style="list-style-type: none"> Focus: Review Game IXL Topic: R.1, R.2, R.3, R.4 R.5, R.6 R.7, R.9, R.10, R.11, X.1, X.2 	Tuesday, October 2nd Unit 2 Test <ul style="list-style-type: none"> Ratios Unit Rate Ratio Tables Graphing Ratio Tables Equivalent Ratios 	IXL Information <p>Username: FirstnameLastname816</p> <p>Password: titans</p>

***If Lost, Please Return to: Ms. Rankin (Room-F106)**

Standards:

MGSE6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

MGSE6.RP.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$ (b not equal to zero), and use rate language in the context of a ratio relationship.

MGSE6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems utilizing strategies such as tables of equivalent ratios, tape diagrams (bar models), double number line diagrams, and/or equations.

MGSE6.RP.3a Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

MGSE6.RP.3b Solve unit rate problems including those involving unit pricing and constant speed.

MGSE6.RP.3d Given a conversion factor, use ratio reasoning to convert measurement units within one system of measurement and between two systems of measurements (customary and metric); manipulate and transform units appropriately when multiplying or dividing quantities. For example, given $1 \text{ in.} = 2.54 \text{ cm}$, how many centimeters are in 6 inches?

Essential Questions:

- What kinds of problems can I solve by using ratios?
- How can I tell if a relationship is multiplicative?
- What is the difference between a multiplicative and an additive relationship?
- What are equivalent ratios?
- What are rates?
- How are unit rates helpful in solving real-world problems?
- How are ratios and rates similar and different?
- What information do I get when I compare two numbers using a ratio?

Vocabulary Words:

- **Proportion:** An equation which states that two ratios are equal.
- **Rate:** A comparison of two quantities that have different units of measure
- **Ratio:** compares quantities that share a fixed, multiplicative relationship.
- **Rational number:** A number that can be written as a/b where a and b are integers, but b is not equal to 0.
- **Tape diagram:** A thinking tool used to visually represent a mathematical problem and transform the words into an appropriate numerical operation. Tape diagrams are linear drawings that look like a segment of tape, used to illustrate number relationships. Also known as Singapore Strips, strip diagrams, bar models or graphs, fraction strips, or length models.
- **Unit Ratio:** are ratios written as some number to 1.
- **Quantity:** is an amount that can be counted or measured.

3.13: Inquiry in Tutorial

Costa's Levels of Thinking and Questioning: Math

LEVEL 1	LEVEL 2	LEVEL 3
<ul style="list-style-type: none"> • What information is provided? • What are you being asked to find? • What formula would you use in this problem? • What does _____ mean? • What is the formula for ...? • List the ... • Name the ... • Where did ...? • What is ...? • When did ...? • Explain the concept of ... • Give me an example of ... • Describe in your own words what _____ means. • What mathematical concepts does this problem connect to? • Draw a diagram of ... • Illustrate how _____ works. 	<ul style="list-style-type: none"> • What additional information is needed to solve this problem? • Can you see other relationships that will help you find this information? • How can you put your data in graphic form? • What occurs when ...? • Does it make sense to ...? • Compare and contrast _____ to _____. • What was important about ...? • What prior research/formulas support your conclusions? • How else could you account for ...? • Explain how you calculate ... • What equation can you write to solve the word problem? 	<ul style="list-style-type: none"> • Predict what will happen to _____ as _____ is changed. • Using a math principle, how can we find ...? • Describe the events that might occur if ... • Design a scenario for ... • Pretend you are ... • What would the world be like if ...? • How can you tell if your answer is reasonable? • What would happen to _____ if _____ (variable) were increased/decreased? • How would repeated trials affect your data? • What significance is this formula to the subject you're learning? • What type of evidence is most compelling to you?

1. Find the ratio of bananas to oranges in the graphic at the right. Write the ratio as a fraction in simplest form. Then explain its meaning.

2. Hiroshi has 4 engines and 18 box cars. Find the ratio of engines to box cars. Write the ratio as a fraction in simplest form. Then explain its meaning.

ANALYZE TABLES
For Exercises 3 and 4, refer to the table showing tide pool animals. Write each ratio in simplest form.

Animals Found in a Tide Pool	
Animal	Number
Anemones	11
Limpets	14
Snails	18
Starfish	9

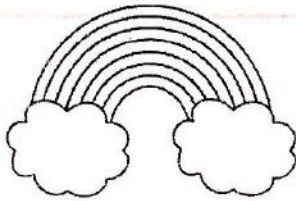
3. Find the ratio of limpets to snails. Then explain its meaning.

4. Find the ratio of snails to the total number of animals. Then explain its meaning.

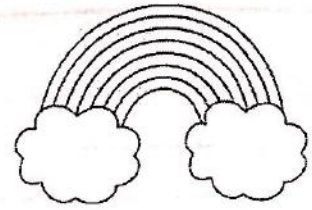
5. A petting zoo has 5 lambs, 11 rabbits, 4 goats, and 4 piglets. Find the ratio of goats to the total number of animals. Write the ratio in simplest form. Then explain its meaning.

6. At the potluck, there were 6 pecan pies, 7 lemon pies, 13 cherry pies, and 8 apple pies. Find the ratio of apple pies to the total number of pies. Write each ratio in simplest form. Then explain its meaning.

Summary:



Taste the Ratio Rainbow!



Name: _____

Date: _____

You are going to be given a small cup with some fruit loops in it. Your task is to use your fruit loops to create several different ratios.

First, list how many you have of each:

GREEN FRUIT LOOPS: _____

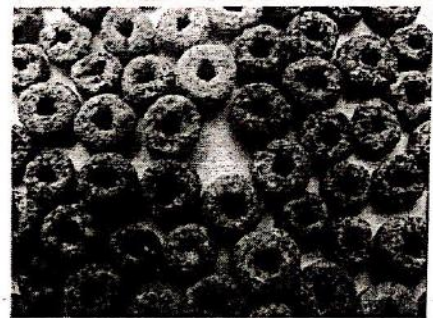
RED FRUIT LOOPS: _____

YELLOW FRUIT LOOPS: _____

PURPLE FRUIT LOOPS: _____

ORANGE FRUIT LOOPS: _____

BLUE FRUIT LOOPS: _____



TOTAL NUMBER OF FRUIT LOOPS IN CUP: _____

Reminder: Ratios can be written 3 ways

1 to 2 1 : 2 $\frac{1}{2}$

(Equivalent Ratio: Is like a simplified/unsimplified fraction)

Example: $\frac{2}{3}$ is equivalent to $\frac{4}{6}$

Now flip over to begin writing rainbow ratios ☺

A. Ratio of YELLOW to RED _____ : _____

B. Ratio of RED to YELLOW: _____ : _____

C. Ratio of GREEN to PURPLE: _____ : _____

D. Ratio of ORANGE to RED: _____ : _____

E. Ratio of RED to BLUE: _____ : _____

F. Ratio of BLUE to ALL: _____ : _____

G. Ratio of ALL to RED + BLUE: _____ : _____

H. Ratio of YELLOW to BLUE to GREEN: _____ : _____ : _____

1.) Write an equivalent ratio for each of the above:

A. _____ : _____

E. _____ : _____

B. _____ : _____

F. _____ : _____

C. _____ : _____

G. _____ : _____

D. _____ : _____

H. _____ : _____ : _____

2.) How many of each color would you expect to be in a pack of 40-50 fruit loops?

Give your answer and explain.

Name: _____

Date: _____

Find and record the ratio of...	Ratio
1. Boy students to girl students	
2. Total students to teachers	
3. Teachers to boy students	
4. Teachers to girl students	
5. Total students to total desks	
6. Desks to chairs	
7. Days in this month to days in last month	
8. Days in the week to days in this month	
9. Clocks to doors	
10. Windows to flags	
11. Tissue boxes to computers	
12. Calendars to flags	
13. Pennant Flags to Bookshelves	
14. Wobble Stools to Blue Chairs	
15. Tables to Desks	
16. Sinks to Cabinets	
17. Boy students to girl students	
18. Total students to teachers	
19. Teachers to boy students	
20. Teachers to girl students	

Essential Question:

Questions:

Notes:

Rate: a ratio comparing two quantities with different units.

Unit Rate: a rate that is simplified so that it has a denominator of 1

Rates and Unit Rates:

$$\frac{60 \text{ miles}}{3 \text{ hours}} \quad \frac{20 \text{ miles}}{1 \text{ hour}} = 20 \text{ miles/hour}$$

$$\frac{40 \text{ words}}{2 \text{ min.}} \quad \frac{20 \text{ words}}{1 \text{ min.}} = 20$$

Convert to Unit Rates:

$\frac{6 \text{ miles}}{3 \text{ hours}}$	$\frac{40 \text{ words}}{2 \text{ min.}}$	$\frac{5 \text{ miles}}{2 \text{ hours}}$
$\frac{6 \div 3}{3 \div 3}$	$\frac{40 \div 2}{2 \div 2}$	$\frac{5 \div 2}{2 \div 2}$
$= \frac{2 \text{ mi.}}{1 \text{ hr.}}$	$= \frac{20 \text{ words}}{1 \text{ min.}}$	$= \frac{2.5 \text{ mi./hr.}}{1}$
= 2 mi./hr.	= 20 words/min.	

Write each rate as a unit rate.

1. 14 hours in 2 weeks
children

2. 36 pieces of candy for 6
children

3. 8 teaspoons for 4 cups

4. 8 tomatoes for \$2

5. Write the ratio \$12 dollars for 3 tickets as a unit rate.

6. Wayne raked 30 bags of leaves in 3 hours. If he raked the same number of bags each hour, how many bags of leaves did he rake in one hour?

7. Mr. Ordonez gives his math students 34 quizzes during 17 weeks of school. If he gave the same number of quizzes each week, how many quizzes does Mr. Ordonez give his students every week?

12. It cost Mrs. Sapanaro \$245 for her and 6 people to take a day-long guided tour of the Everglades. How much does the guided tour cost per person?

13. Stephanie ran 1 lap in 6 minutes. At this rate, how far would she run in 30 minutes?

14. In general, the air temperature decreases 12°F for every 4,000 feet increase in altitude. If a hiker climbs 3,000 feet, by how much can she expect the temperature to decrease?

15. One bottle of shampoo costs \$6 for 8 ounces. A second bottle costs \$4 for 5 ounces of shampoo. Which has the lower unit rate? How much lower?

Summary:

Unit Rate:

Ms. Rankin loves Starbucks coffee. Today, while waiting to place her order for her iced non-fat caramel macchiato, she noticed the prices for the three sizes that were available.

She could order:



Tall
12 oz
\$3.55



Grande
16 oz
\$4.25



Venti
20 oz
\$4.55

Part A

What is the unit rate for each size:

Tall	Grande	Venti

Part B

Which size is the better unit rate? _____

Part C

Use what you know about unit rates to explain how you determined your answer. Use words, numbers, and/or symbols in your explanation.

Taking Unit Rate, 1 Step Further...

1. Elsa is throwing a surprise party for Olaf's birthday. The ice cream cake costs \$28 for 14 servings. How much does it cost for 1 serving?

2. Elsa finds out that 6 more of the trolls will be able to attend the birthday party making the total guest count 20 servings. How much would the ice cream cake cost for 20 servings?

3. Dory is counting seashells in the ocean. She counts 100 seashells in 5 days. How many seashells does she count in 1 day?

4. If Dory continues counting seashells at this rate, how many will she count in 8 days?

Ratio Tables

A **ratio table** organizes data into columns that are filled with pairs of numbers that have the same ratio or are equivalent. **Equivalent ratios** express the same relationship between two quantities.

Example 1

BAKING You need 1 cup of rolled oats to make 24 oatmeal cookies. Use the ratio table below to find how many oatmeal cookies you can make with 5 cups of rolled oats.

Cups of Oats	1				5
Oatmeal Cookies	24				

Find a pattern and extend it.

Cups of Oats	1	2	3	4	5
Oatmeal Cookies	24	48	72	96	120

$+1$ $+1$ $+1$ $+1$

 $+24$ $+24$ $+24$ $+24$

So, 120 oatmeal cookies can be made with 5 cups of rolled oats.

Multiplying or dividing two related quantities by the same number is called **scaling**. You may sometimes need to *scale back* and then *scale forward* or vice versa to find an equivalent ratio.

Example 2

SHOPPING A department store has socks on sale for 4 pairs for \$10. Use the ratio table at the right to find the cost of 6 pairs of socks.

Pairs of Socks		4	6
Cost in Dollars		10	

There is no whole number by which you can multiply 4 to get 6. Instead, scale back to 2 and then forward to 6.

So, the cost of 6 pairs of socks would be \$15.

Pairs of Socks	2	4	6
Cost in Dollars	5	10	15

$\div 2$ $\times 3$

 $\div 2$ $\times 3$

Exercises

For Exercises 1–2, use the ratio tables given to solve each problem.

- EXERCISE** Keewan bikes 6 miles in 30 minutes. At this rate, how long would it take him to bike 18 miles?

Distance Biked (mi)	6		18
Time (min)	30		

- HOBBIES** Christine is making fleece blankets. 6 yards of fleece will make 2 blankets. How many blankets can she make with 9 yards of fleece?

Yards of Fleece		6	9
Number of Blankets		2	

Problem-Solving Practice

Ratio Tables

For Exercises 1–4, use the ratio tables below to solve each problem.

Table 1

Cups of Flour	1			
Number of Cookies	30			

Table 2

Number of Books		6	
Cost in Dollars		10	

1. **BAKING** In Table 1, how many cookies could you make with 4 cups of flour?

2. **BAKING** In Table 1, how many cups of flour would you need to make 90 cookies?

3. **BOOKS** In Table 2, at this rate how many books can you buy with \$5?

4. **BOOKS** In Table 2, at this rate, how much would it cost to buy 9 books?

5. **FRUIT** Patrick buys 12 bunches of bananas for \$9 for the after school program. Use a ratio table to determine how much Patrick will pay for 8 bunches of bananas.

6. **HIKING** On a hiking trip, LaShana notes that she hikes about 12 kilometers every 4 hours. If she continues at this rate, use a ratio table to determine about how many kilometers she could hike in 6 hours.

Name: _____

Date: _____

You learned that tables can be used to organize sets of equivalent ratios. Let's look at this a bit more closely:

Guacamole

To make Mrs. Ansley's favorite guacamole recipe, use 2 jalapenos and 3 avocados. Use this information to complete the ratio table below:

Jalapenos		4		10			
Avocados		9	12				

Shante has 8 jalapenos at her house. How many avocados should she use if she wants her guacamole to taste the same?

If Ty uses 10 jalapenos and 14 avocados, will the guacamole turn out too spicy or not spicy enough? _____

How many avocados should be used with 10 jalapenos? _____

How many jalapenos should be used with 22 avocados? _____

Purple Paint

Shauna went with her mom to pick out a new purple paint for her bedroom. After working with the paint expert at Home Depot, she created a color that was 6 drops red to 4 drops blue.

Red Paint	Blue Paint
6	4
	8
18	

What is the simplest form of the ratio of red to blue? Write 3 different ways.

If the paint expert mixes 12 drops of red paint with 8 drops of blue paint, will it create the same shade of purple? Explain.

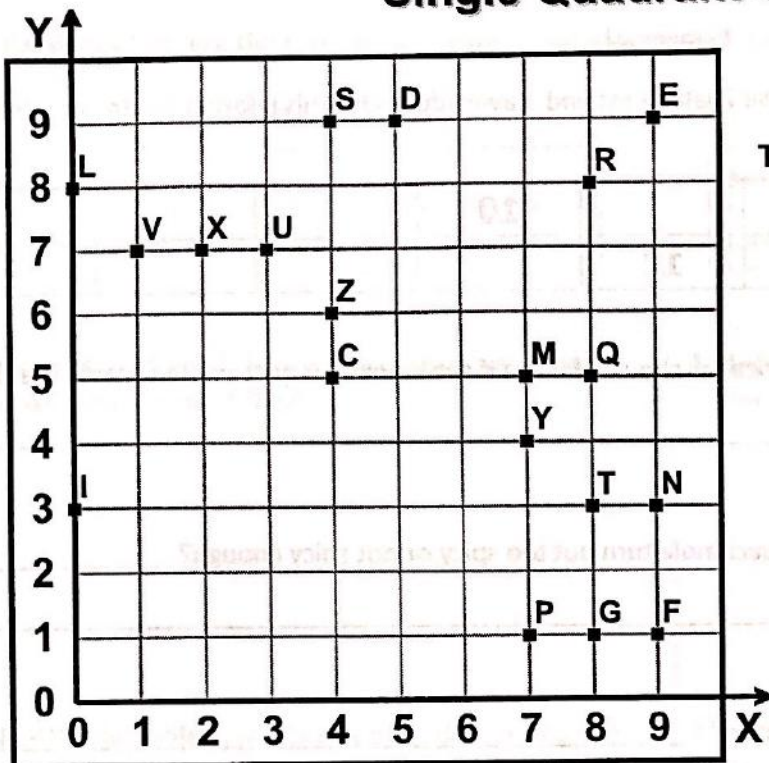
Name : _____

Score : _____

Teacher : _____

Date : _____

Single Quadrant Ordered Pairs



Tell what point is located at each ordered pair.

1) (8,3) _____ 6) (9,9) _____

2) (3,7) _____ 7) (1,7) _____

3) (0,8) _____ 8) (4,9) _____

4) (5,9) _____ 9) (4,5) _____

5) (7,5) _____ 10) (9,3) _____

Write the ordered pair for each given point.

11) F _____

14) Y _____

17) G _____

12) Z _____

15) P _____

18) X _____

13) Q _____

16) I _____

19) R _____

Plot the following points on the coordinate grid.

20) A (1,4)

22) K (0,2)

24) J (1,8)

21) O (7,7)

23) B (5,4)

25) W (3,4)

Mystery Picture

Connect dots. Start new line when you see Stop 😊

① 6, 16
7, 16
7, 15
STOP

10, 4
10, 7
9, 8
9, 9
STOP

18, 13
17, 10
17, 8
16, 7
16, 5
17, 4
17, 3
15, 3
STOP

② 14, 7
14, 4
15, 3
15, 2
12, 2
STOP

⑤ 2, 15
3, 16
2, 16
2, 13
3, 12
5, 12

⑦ 3, 16
4, 16
5, 15
6, 17
5, 18
4, 18
3, 20
6, 20
8, 17
8, 16
10, 16
10, 17
9, 17
8, 19
11, 19
12, 16
10, 14
10, 12
STOP

③ 6, 4
7, 3
6, 2
2, 2
1, 3
3, 5
5, 5
6, 4
8, 3
8, 1
7, 0
1, 0
0, 1
0, 3
2, 4
STOP

6, 11
4, 9
6, 9
7, 10
8, 10
9, 9
11, 11
10, 12
8, 10
STOP

⑥ 11, 11
12, 12
15, 12
16, 11
17, 14
14, 18
13, 18
12, 19
15, 19
18, 15

④ 12, 6
12, 2
9, 2
9, 3

Put a small circle at (6, 15)

Name _____

Date _____

20																			
19																			
18																			
17																			
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1																			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	

Unit 2: Graphing Ratio Tables Lesson

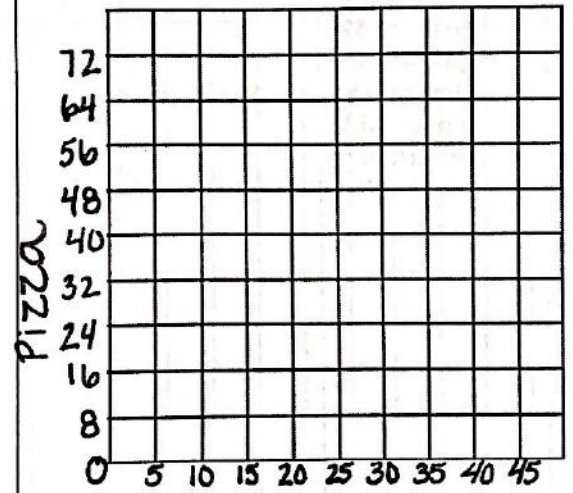
Question

Ratio Table

Graph

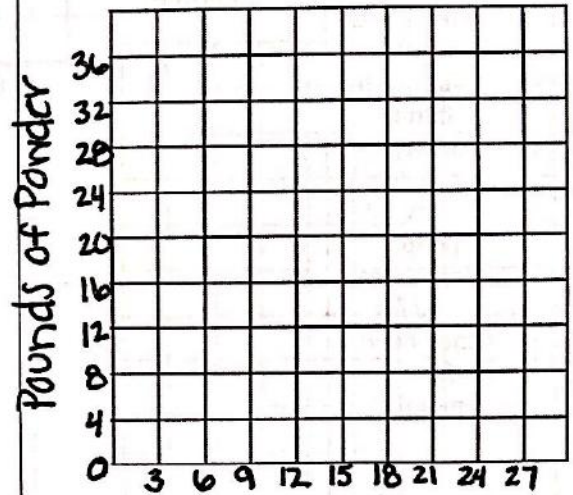
1. There are 5 boys attending John's birthday party. They are ordering 16 pizzas. How many pizzas should they order for 20 boys?

Boys	Pizza
5	16
20	



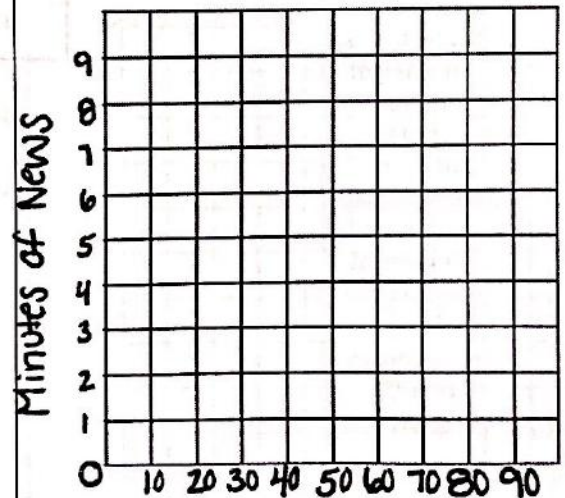
2. Susan is making a cake. She puts 3 cups of water in for every 4 pounds of powder (flour, sugar, etc.). How many cups of water does she need for 20 pounds of powder?

Cups of water	3				
Pounds of powder	4	8	12		



3. Jenna's family is listening to the radio in the car. For every 20 minutes of music, they listen to 2 minutes of news. How many minutes of news do they listen to for 60 minutes of music?

Minutes of music	20	30	40	50	60
Minutes of news	2	3			



Homework

1. Betty is making apple pies for an event. To make 5 pies, you need 2 pounds of apples. How many pounds of apples do you need for 20 pies?

Number of Pies	5			20
Pounds of Apples	2			

2. A zoo requires that 1 adult accompany every 7 students that visit the zoo. How many adults must accompany 28 students?

Adults	1			
Students	7			28

3. Rachel purchased 200 beads for \$48 to make necklaces. If she needed to buy 50 beads, how much would it cost?

# of Beads	50			200
Dollars				\$48

Essential Question:

Questions:

Notes:

6th Grade Math 6.RP.A.1.

Find Equivalent Ratios

Ratio of Boys to Girls: 3 to 5 or $\frac{3}{5}$

Boys	3	6	9	12
Girls	5	10	15	20

Mult. by 2:

$$\frac{3}{5} \cdot \frac{2}{2} = \frac{6}{10}$$

Mult. by 3:

$$\frac{3}{5} \cdot \frac{3}{3} = \frac{9}{15}$$

Mult. by 4:

$$\frac{3}{5} \cdot \frac{4}{4} = \frac{12}{20}$$

Even saves \$2 of every \$5 he earns mowing lawns.

\$ Saved	2			8	10	20		
\$ Spent	3	6	9		45		60	
Total \$ Earned	5	10			25			150

How much will Even have saved when he has earned \$150?

Finding Equivalent Ratios

Equivalent: Equal to or of the same value

Are the following equivalent?

\$225 for 5 tickets and \$150 for 3 tickets

BM 19

Determine if each pair of ratios or rates are equivalent.

1. \$18 for 3 bracelets; \$30 for 5 bracelets

2. 120 Calories in 2 servings; 360 Calories in 6 servings

3. 4 hours worked for \$12; 7 hours worked for \$28

4. 15 blank CDs for \$5; 45 blank CDs for \$15

5. 24 points scored in 4 games; 48 points scored in 10 games

6. 15 out of 20 students own hand-held games; 105 out of 160 students own hand-held games.

Summary:

#1

Solve the proportion below:

$$\frac{12}{9} = \frac{v}{3}$$

#2

Solve the proportion below:

$$\frac{m}{5} = \frac{28}{20}$$

#3

Solve the proportion below:

$$\frac{1}{g} = \frac{6}{12}$$

#4

Solve the proportion below:

$$\frac{6}{7} = \frac{30}{k}$$

#5

A recipe calls for 4 cups of sugar and 16 cups of water. How much water is needed if you only have 1 cup of sugar?

#6

The trail mix you are making calls for 3 cups of raisins for each cup of peanuts. How many cups of raisins do you need if you have 3 cups of peanuts?

#7

It takes Luis 15 minutes to read 3 pages. How long will it take him to read 90 pages?

#8

Chrissy is entering a bike race for charity. Her father pledges \$0.80 for each 0.5 miles she bikes. If Chrissy bikes 18.5 miles, how much will her father donate?

#9

Solve the proportion below:

$$\frac{3}{2} = \frac{24}{g}$$

#10

Solve the proportion below:

$$\frac{w}{40} = \frac{3}{8}$$

#11

Solve the proportion below:

$$\frac{6}{14} = \frac{y}{7}$$

#12

Solve the proportion below:

$$\frac{5}{r} = \frac{7}{77}$$

#13

Jolene mixes 3 parts of white paint to 8 parts of red paint to make pink. How many parts of red paint should she mix with 12 parts of white paint to get the same shade?

#14

One water molecule has 2 hydrogen atoms to 1 oxygen atom. How many hydrogen atoms are in 4 water molecules?

#15

A recipe for punch calls for 5 parts grape soda to 2 parts seltzer. If Hector has 10 cups of grape soda, how much seltzer does he need?

#16

Eric can run 1 mile in 6.5 minutes. How long will it take him to run 3.5 miles?