

Name _____

Math Hour: _____

Date I Started This Packet: ____ / ____ / ____

Date I Finished This Packet: ____ / ____ / ____

6th Grade Math Chapter Portfolio

Chapter 1: Ratios and Rates

DDIRECTIONS: Keep this packet safe from now until we finish Chapter 1 (likely several weeks). You will be completing assignments out of this packet on a daily basis, sometimes in class, sometimes as homework. You will also log this chapter's learning targets and self-assess how you are doing. Please make sure to complete everything in PENCIL. At the END of the chapter, you will need to take this packet home to be signed by a parent.

Lesson	Date	Learning Target	Reteach Grade %	HW Practice Grade %	How well do I "get this"?
1.1					0 1 2 3 4
1.2					0 1 2 3 4
1.3					0 1 2 3 4
1.4					0 1 2 3 4
1.5					0 1 2 3 4
1.6					0 1 2 3 4
1.7					0 1 2 3 4
Review		See all above learning targets.			0 1 2 3 4

Teacher Comments: _____

Parent Signature (wait until portfolio is completed): _____

Lesson 1 Reteach

Factors and Multiples

The **greatest common factor (GCF)** of two or more numbers is the greatest of the common factors of the numbers. The smallest number that is a multiple of two or more whole numbers is the **least common multiple (LCM)** of the numbers.

Example 1

Find the GCF of 12 and 30.

Make an organized list of the factors for each number.

Factors of 12: 1, 2, 3, 4, 6, 12

Factors of 30: 1, 2, 3, 5, 6, 10, 15, 30.

The common factors are 1, 2, 3, and 6. The greatest is 6.

So, the GCF of 12 and 30 is 6.

Example 2

Find the LCM of 6 and 15.

List the multiples of each number.

Multiples of 6: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, ...

Multiples of 15: 15, 30, 45, 60, ...

Notice that 30 and 60 are common multiples.

The least common multiple of 6 and 15 is 30.

Exercises

Find the GCF of each set of numbers.

1. 6, 12 _____

2. 28, 42 _____

3. 44, 55 _____

4. 35, 20, 15 _____

Find the LCM of each set of numbers.

5. 5, 6 _____

6. 6, 8 _____

7. 4, 10 _____

8. 15, 12 _____

Lesson 1 Homework Practice

Factors and Multiples

Find the GCF of each set of numbers.

1. 12, 30 _____

2. 50, 40 _____

3. 28, 42, 56 _____

4. 14, 56, 63 _____

ANALYZE TABLES A store is organizing toys into bins. The toys must be put into bins so that each bin contains the same number of toys without mixing the toys.

Toys to Place in Bins	
Toy	Number of Toys
Anemones	12
Limpets	14
Snails	18

5. What is the greatest number of toys that can be put in a bin?

6. How many bins are needed for each type of toy?

Find the LCM of each set of numbers.

7. 3, 5 _____

8. 8, 12 _____

9. 4, 5, 6 _____

10. 5, 10, 15 _____

11. Avery gets newsletters by e-mail. He gets one for sports every 5 days, one for model railroads every 10 days, and one for music every 8 days. If he got all three today, how many more days will it be until he gets all three newsletters on the same day again?

Lesson 2 Reteach

Ratios

A **ratio** is a comparison of two numbers by division. A common way to express a ratio is as a fraction in simplest form. Ratios can also be written in other ways. For example, the ratio $\frac{2}{3}$ can be written as 2 to 3, 2 out of 3, or 2:3.

Examples

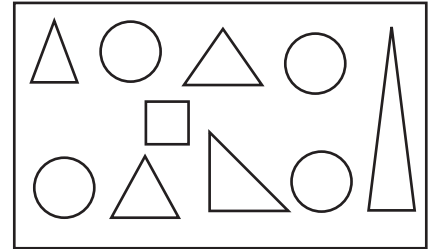
Refer to the diagram at the right.

- Write the ratio in simplest form that compares the number of circles to the number of triangles.

$$\begin{array}{l} \text{circles} \rightarrow \frac{4}{5} \\ \text{triangles} \rightarrow \frac{4}{5} \end{array} \quad \text{The GCF of 4 and 5 is 1.}$$

So, the ratio of circles to triangles is $\frac{4}{5}$, 4 to 5, or 4:5.

For every 4 circles, there are 5 triangles.



- Write the ratio in simplest form that compares the number of circles to the total number of figures.

$$\begin{array}{l} \text{circles} \rightarrow \frac{4}{10} \\ \text{total figures} \rightarrow \frac{4}{10} \end{array} = \frac{2}{5} \quad \text{The GCF of 4 and 10 is 2.}$$

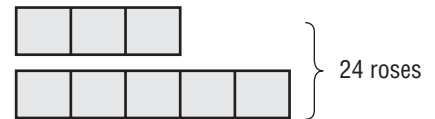
The ratio of circles to the total number of figures is $\frac{2}{5}$, 2 to 5, or 2:5.

For every two circles, there are five total figures.

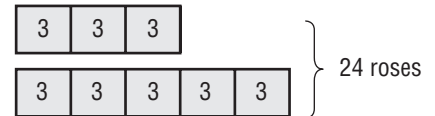
Example 3

Divide 24 roses into 2 groups so the ratio is 3 to 5.

Use a bar diagram. Show a group of 3 and a group of 5.



Because there are 8 sections, each section represents $24 \div 8$, or 3 roses.



There are 9 roses in the first group and 15 roses in the second group.

Exercises

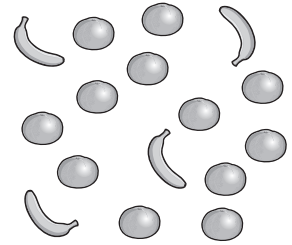
Write each ratio as a fraction in simplest form. Then explain its meaning.

- 2 guppies to 6 seahorses
- 12 puppies to 15 kittens
- SPELLING** A sentence has 5 misspelled words and 15 correctly spelled words. Find the ratio of misspelled words to correctly spelled words.

Lesson 2 Homework Practice

Ratios

1. **FRUITS** 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. **MODEL TRAINS** 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. **ZOOS** 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. **FOOD** 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.
7. **BAKERY** Rolls are being prepared to go to grocery stores. Divide 72 rolls into 2 groups so the ratio is 3 to 5.
8. **LAUNDRY** A basket of laundry is being separated. Divide 48 pieces of clothing into 2 groups so the ratio is 1 to 3.

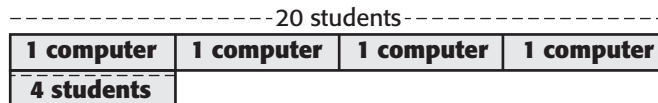
Lesson 3 Reteach

Rates

A **rate** is a ratio of two measurements having different kinds of units. When a rate is simplified so that it has a denominator of 1, it is called a **unit rate**.

Example 1

Use a bar diagram to show the ratio *20 students to 5 computers* as a unit rate.



The bar diagram shows the number of students divided by the number of computers. It represents the number of students per computer.

The ratio written as a unit rate is *4 students to 1 computer*.

You can also find a unit rate by dividing.

Example 2

Benito ate 48 raisins in 8 minutes. How many raisins did he eat per minute, if he ate the same number each minute?

$$\frac{48 \text{ raisins}}{8 \text{ minutes}} = \frac{6 \text{ raisins}}{1 \text{ minute}}$$

Divide the numerator and denominator by 8 to get a denominator of 1.

The unit rate is 6 raisins per minute.

Exercises

Write each rate as a unit rate.

1. 6 eggs for 3 people
2. \$12 for 4 pounds
3. 40 pages in 8 days

4. **GROCERIES** Mr. Gonzalez spends \$135 for 5 bags of groceries. How much does he spend per bag of groceries, if each bag costs the same?

5. **TRAIN** Ms. Terry travels by train to see famous theme parks. She travels a distance of 728 miles in 8 hours. If the train maintains a constant speed, how many miles does she travel in one hour?

6. **FOOTBALL** A quarterback throws 222 yards in 6 games. How many yards does he throw in one game if he throws the same amount in each game?

Lesson 3 Homework Practice

Rates

Write each rate as a unit rate.

1. 3 inches of rain in 6 hours
2. \$46 for 5 toys
3. 70 miles in 2 hours
4. 64 ounces in 8 cups
5. **CLASSES** A school has 825 students and 55 teachers. How many students are there per teacher?
6. **CELL PHONE** Tiffany pays \$40 for 160 minutes of talk time on her cell phone. How many minutes of talk time does she get per dollar?
7. **HAMBURGERS** Mrs. Farley made 72 ounces of hamburger into 24 meat patties. How many ounces of hamburger are in each meat patty?

For Exercises 8 and 9, refer to the table showing the statistics of women's baseball teams.

The Flamingo League Stats		
Team	Games	Losses
Jules' Rules	36	12
Pink Sox	68	17
Go-Girls	52	13
High-5s	72	8

8. For each team, find the unit rate *games per loss*.
9. Which team has the best record? Explain how you know.
10. **BREAKFAST** Franco is making breakfast. He uses 36 eggs for 12 orders. How many eggs does he use per order?
11. **TRAINS** A train travels 558 miles in 3 hours. At this rate, how far does the train travel per hour?
12. **SCHEDULES** A bus makes 28 stops every 2 hours. How many stops does it make in 3 hours? in 4 hours?

Lesson 4 Reteach

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

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.

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		4	6
Cost in Dollars		10	■

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

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	■

Lesson 4 Homework Practice

Ratio Tables

For Exercises 1–3, use the ratio tables given to solve each problem.

1. **CAMPING** To disinfect 1 quart of stream water to make it drinkable, you need to add 2 tablets of iodine. How many tablets do you need to disinfect 4 quarts?

Number of Tablets	2			■
Number of Quarts	1			4

2. **BOOKS** A book store bought 160 copies of a book from the publisher for \$4,000. If the store gives away 2 books, how much money will it lose?

Cost in Dollars	4,000			■
Number of Copies	160			2

3. **BIRDS** An ostrich can run at a rate of 50 miles in 60 minutes. At this rate, how long would it take an ostrich to run 15 miles?

Distance Run (mi)	50			15
Time (min)	60			■

4. **SALARY** Luz earns \$400 for 40 hours of work. Use a ratio table to determine how much she earns for 6 hours of work.

5. **DISTANCE** If 10 miles is about 16 kilometers and the distance between two towns is 45 miles, use a ratio table to find the distance between the towns in kilometers. Explain your reasoning.

RECIPES For Exercises 6–8, use the following information.

A soup that serves 16 people calls for 2 cans of chopped clams, 4 cups of chicken broth, 6 cups of milk, and 4 cups of cubed potatoes.

6. Create a ratio table to represent this situation.
7. How much of each ingredient would you need to make an identical recipe that serves 8 people? 32 people?
8. How much of each ingredient would you need to make an identical recipe that serves 24 people? Explain your reasoning.

Lesson 5 Reteach

Graph Ratio Tables

A **coordinate plane** is formed when two number lines intersect at their zero points. This intersection is called the **origin**. The horizontal number line is called the **x-axis**. The vertical number line is called the **y-axis**.

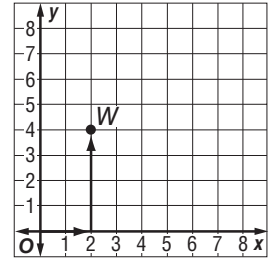
An **ordered pair** is used to name a point on a coordinate plane. The first number in the ordered pair is the **x-coordinate**, and the second number is the **y-coordinate**.

Example 1

Graph the point $W(2, 4)$.

Start at the origin. Move 2 units to the right along the x -axis.

Then move 4 units up to locate the point. Draw a dot and label the point W .



Example 2

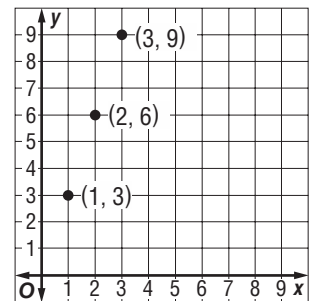
TICKETS Tickets to the school play cost \$3 each. The costs of 1, 2, and 3 tickets are shown in the table. List this information as ordered pairs (number of tickets, cost).

The ordered pairs are (1, 3), (2, 6), and (3, 9).

Ticket Costs	
Number of Tickets	Cost (\$)
1	3
2	6
3	9

Example 3

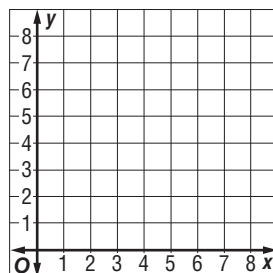
Graph the ordered pairs from Example 2.



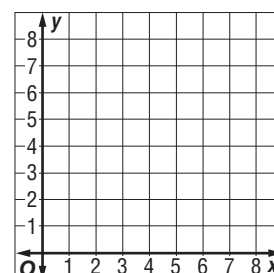
Exercises

Graph and label each point on the coordinate plane.

1. $S(1, 3)$



2. $T(4, 0)$

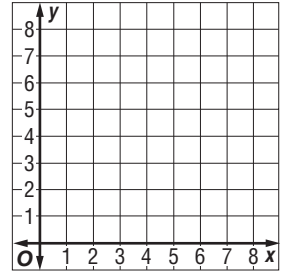


Lesson 5 Homework Practice

Graph Ratio Tables

Graph and label each point on the coordinate plane at the right.

- 1. $N(8, 6)$
- 2. $P(0, 8)$
- 3. $R(4, 8)$
- 4. $S(3, 4)$
- 5. $T(6, 8)$
- 6. $W(6, 2)$
- 7. $A(8, 2)$
- 8. $B(2, 7)$

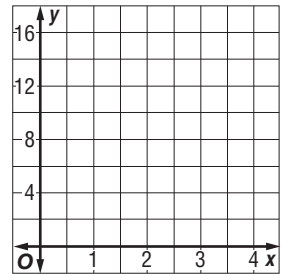


9. **CAR WASH** Use the following information.

A car wash can wash four cars in one hour. The table shows the total number of cars washed in 0, 1, 2, and 3 hours.

Hours	0	1	2	3
Cars Washed	0	4	8	12

- a. List this information as ordered pairs (number of hours, number of cars washed).
- b. Graph the ordered pairs on the coordinate plane at the right. Then describe the graph.

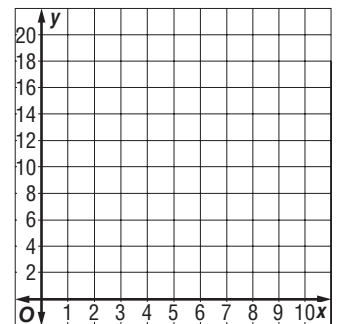


10. **ERASERS** Erasers cost 5 cents each at the school store. The table shows this relationship.

- a. List this information as ordered pairs (number of erasers, cost).

Cost of Erasers	
Number of Erasers	Cost (¢)
1	5
2	10
3	15
4	20

- b. Graph the ordered pairs. Then describe the graph.



Lesson 6 Reteach

Equivalent Ratios

Two ratios are said to be **equivalent ratios** if they have the same unit rate.

Example 1

Determine if each pair of rates are equivalent. Explain your reasoning.

\$35 for 7 balls of yarn; \$24 for 4 balls of yarn.

Write each rate as a fraction. Then find its unit rate.

$$\frac{\$35}{7 \text{ balls of yarn}} = \frac{\$5}{1 \text{ ball of yarn}} \quad \frac{\$24}{4 \text{ balls of yarn}} = \frac{\$6}{1 \text{ ball of yarn}}$$

Since the rates do not share the same unit rate, they are not equivalent.

Example 2

Determine if each pair of ratios are equivalent. Explain your reasoning.

8 boys out of 24 students; 4 boys out of 12 students

Write each ratio as a fraction.

$$\frac{8 \text{ boys}}{24 \text{ students}} = \frac{4 \text{ boys}}{12 \text{ students}} \quad \leftarrow \text{The numerator and the denominator are divided by the same number.}$$

Since the fractions are equivalent, the ratios are equivalent.

Exercises

Determine if each pair of ratios or rates are equivalent. Explain your reasoning.

- \$12 saved after 2 weeks; \$36 saved after 6 weeks
- \$9 for 3 magazines; \$20 for 5 magazines
- 135 miles driven in 3 hours; 225 miles driven in 5 hours
- 24 computers for 30 students; 48 computers for 70 students

Lesson 6 Homework Practice

Equivalent Ratios

Determine if each pair of ratios or rates are equivalent. Explain your reasoning.

- 18 vocabulary words learned in 2 hours; 27 vocabulary words learned in 3 hours
- \$15 for 5 pairs of socks; \$25 for 10 pairs of socks
- 20 out of 45 students attended the concert; 12 out of 25 students attended the concert
- 78 correct answers out of 100 test questions; 39 correct answers out of 50 test questions
- 15 minutes to drive 21 miles; 25 minutes to drive 35 miles

ANIMALS For Exercises 6–8, refer to the table on lengths of some animals with long tails. Determine if each pair of animals has the same ratio of body length to tail length. Explain your reasoning.

Animal Lengths (mm)		
Animal	Head & Body	Tail
Brown Rat	240	180
Hamster	250	50
Lemming	125	25
Opossum	480	360
Prairie Dog	280	40

6. brown rat and opossum
7. hamster and lemming
8. opossum and prairie dog

Lesson 7 Reteach

Ratio and Rate Problems

You can solve rate and ratio problems by using a bar diagram or by using a unit rate.

Example 1

NUTRITION Three servings of broccoli contain 150 Calories. How many Calories will 5 servings contain?

Method 1 Use a bar diagram.



Draw a bar diagram to represent the situation. Each section represents $150 \div 3$, or 50 Calories.



So, 5 servings of broccoli contain 250 Calories.

Method 2 Use a unit rate.

Step 1 Find the unit rate. $\frac{150 \text{ Calories}}{3 \text{ servings}} = \frac{\square \text{ Calories}}{1 \text{ serving}}$ $\frac{150 \text{ Calories}}{3 \text{ servings}} = \frac{50 \text{ Calories}}{1 \text{ serving}}$

Step 2 Multiply. $\frac{50 \text{ Calories}}{1 \text{ serving}} \times 5 \text{ servings} = 250 \text{ Calories}$

You can also solve ratio and rate problems by using equivalent fractions.

Example 2

SURVEY In one survey, three out of five students agreed that the school needs a new cafeteria. Predict how many of the 600 students in the school would agree that the school needs a new cafeteria.

agree $\rightarrow \frac{3}{5} = \frac{\square}{600}$ \leftarrow agree Write a ratio comparing the number of students
total $\rightarrow \frac{3}{5} = \frac{\square}{600}$ \leftarrow total who agree to the total number of students.

$$\frac{3}{5} = \frac{360}{600}$$

Since $5 \times 120 = 600$, multiply 3 by 120.

So, 360 students would agree that the school needs a new cafeteria.

Exercises

Solve.

1. **MUSIC** Jeremy spent \$33 on 3 CDs. At this rate, how much would 5 CDs cost?
2. **AQUARIUM** At an aquarium, 6 out of 18 deliveries are plants. Out of 15 deliveries in one week, how many are plants?
3. **ELECTIONS** Three out of four students surveyed in a school said they will vote for Nuncio for class president. Predict how many of the 340 students in the school would vote for Nuncio.

Lesson 7 Homework Practice

Ratio and Rate Problems

Solve.

- MAMMALS** A pronghorn antelope can travel 105 miles in 3 hours. If it continued traveling at the same speed, how far could a pronghorn travel in 11 hours?
- BIKES** Out of 32 students in a class, 5 said they ride their bikes to school. Based on these results, how many of the 800 students in the school ride their bikes to school?
- MEAT** Hamburger sells for 3 pounds for \$6. If Samantha buys 10 pounds of hamburger, how much will she pay?
- FOOD** If 24 extra large cans of soup will serve 96 people, how many cans should Ann buy to serve 28 people?
- BIRDS** The ruby-throated hummingbird has a wing beat of about 200 beats per second. About how many wing beats would a hummingbird have in 3 minutes?

Use the table to answer questions 6–9. The table shows the vehicles that passed Luann on the highway.

- At this rate, how many minivans would pass Luann if 60 vehicles passed her?
- At this rate, how many trucks would pass Luann if 90 vehicles passed her?
- If 150 vehicles passed Luann, how many more minivans than cars would you expect to pass her? Assume the rate continues.
- Luann predicted that if a certain number of vehicles passed her by, 42 of them would be SUVs. What was that certain number of vehicles she had in mind?

Types of Vehicles	Number of Vehicles
Car	6
Truck	10
SUV	14
Minivan	15

Test, Form 3A

SCORE _____

1. Carlo attends art class every 4 weeks, chess club every 2 weeks, and fencing lessons every 3 weeks. If he attended all three this week, when will he attend all three again?

1. _____

2. In a certain area, there are 35 houses to 55 businesses. Write the ratio of houses to businesses as a fraction in simplest form. Then explain its meaning.

2. _____

3. The table shows results of a survey about the types of video games students own. Find the ratio of the number of video games rated Everyone 10+ to the total number of video games.

Ratings Video Games	
Rated	Number of Games
Early Childhood	133
Everyone	130
Everyone 10+	140
Teen	212

3. _____

4. On his fruit stand, Mr. Roberts has 13 papayas, 23 star fruits, 35 mangos, and 19 strawberries. What is the ratio of the number of mangos to the total number of pieces of fruit?

4. _____

Write each ratio as a unit rate.

5. 162 heartbeats in 60 seconds

5. _____

6. 216 diving students to 12 instructors

6. _____

7. 630 meters in 18 seconds

7. _____

Test, Form 3A *(continued)*

For Exercises 8 and 9, use the ratio table given to solve each problem.

8. Maggie’s grandmother uses 16 limes to make 2 key lime pies. At this rate, how many limes does she need to make 6 key lime pies?

Limes	16	■
Pies	2	6

8. _____

9. Ms. Sims traveled to 42 countries in 60 days. At this rate, how many countries would she travel to in 40 days?

Countries	42		■
Days	60		40

9. _____

10. After working for 25 hours, Lamar made \$375. After working for 40 hours, Lamar made \$600. Predict how much he would make after 10 hours of work.

10. _____

11. Determine if the rates \$168 raised for washing 24 cars and \$280 raised for washing 40 cars are equivalent. Explain your reasoning.

11. _____

12. Suppose 40 out of 90 people are bowlers and 3 out of every 16 of the bowlers have their own bowling ball. At the same rates, in a group of 192 people, predict how many you would expect to have a bowling ball.

12. _____

13. A particular amusement park ride will make 156 revolutions in 180 seconds. At this rate, how many revolutions will it make in 2 minutes?

13. _____

14. The costume designer for the school play uses 4 feet of fabric to make 8 costumes. At the same rate, how many costumes can the designer make with 4 yards of fabric?

14. _____

15. Nina can type 45 words per minute. Write the ordered pairs (number of minutes, number of words) Nina can type for 0, 1, 2, and 3 minutes.

15. _____