Chapter 5 – Rate, Ratio and Proportion

Contents

Introduction to Rates and Ratios

Name _____

1. Write the ratio in lowest terms, then write it in the other two forms.

   a. $\frac{12}{16}$ Lowest Terms: Other Forms:

   b. $10 \text{ to } 15$ Lowest Terms: Other Forms:

   c. $26:12$ Lowest Terms: Other Forms:

2. Write the rate as a unit rate.

   a. $\frac{450 \text{ miles}}{18 \text{ gallons}} =$

   b. $\frac{5 \text{ feet}}{2 \text{ seconds}} =$

   c. $\frac{228 \text{ calories}}{6 \text{ ounces}} =$

   d. $\frac{260 \text{ miles}}{4 \text{ hours}} =$

   e. $\frac{\$14.95}{5 \text{ pounds}} =$

   f. $\frac{\$390}{40 \text{ hours}} =$

3. There are 45 members in a marching band. Fifteen play the trumpet, 12 play the drums, 6 play the French horn, 3 play the saxophone, 2 play the tuba, and 1 plays the cymbals.

   a. What is the ratio of trumpet players to saxophone players? Write your answer in lowest terms.

   b. What is the ratio of trumpet players to band members? Write your answer in lowest terms.

   c. What is the ratio of tuba players to drum players? Write your answer in lowest terms.

Unit Prices Internet Activity

Name _____

Use the internet to find two comparable products online. You can use the same brand in two different sizes or from two different stores, or two similar products from different brands. Record the information from each product and calculate the unit price. Repeat for another pair of comparable products.

Product, size and price: Unit Price:	Comparable product, size and price: Unit Price:

Which one would you buy? Why?

Product, size and price: Unit Price:	Comparable product, size and price: Unit Price:

Which one would you buy? Why?

Solving Proportion Problems

Name _____

1. Decide whether the proportion is true or false and then compare the cross products to verify your answer.

   a. $\frac{1}{2} = \frac{2}{4}$ b. $\frac{7}{3} = \frac{9}{4}$ c. $\frac{15}{18} = \frac{10}{12}$

2. Solve each proportion:

   a. $\frac{7}{14} = \frac{2}{x}$ b. $\frac{8}{12} = \frac{x}{15}$ c. $\frac{x}{20} = \frac{5}{8}$

Set up a proportion to solve the following rate and proportion problems. Write your answer using a complete sentence.

3. Eduardo spent 6 hours completing 21 math problems last week. How long might he expect to spend completing 28 math problems this week?

$$\frac{\square}{\square} = \frac{\square}{\square}$$

4. The sales tax on an item that costs $35 is $2.10. What is the sales tax on an item that costs $68?

5. On a map, 6 centimeters represents 2 miles. If Cowpoke Junction is 9 centimeters from Wild Bill Butte on the map, how many miles apart are these two locations?

6. Horse A can travel 40 kilometers in 4 hours. Horse B can travel 63 kilometers in 7 hours. Which horse traveled faster?

7. Which is steeper a ramp that is 5 feet high and 10 feet long or a ramp that is 8 feet high and 15 feet long? How do you know?

8. Heart disease is the leading cause of death in the U.S. for both men and women. If 1 in 4 deaths is due to heart disease, then how many people in a 32 person class may die of heart disease?

9. Three scoops of coffee are used with 4 cups of water in a coffee machine. Four scoops of coffee are used with 16 cups of water in another coffee machine. Which brew will be stronger? Show your reasoning steps. A diagram may help.

10. A recipe calls for 2 ½ cups of flour and 2/3 cup of sugar.
    a. If you use 1 cup of sugar, how much flour will you need? Show your reasoning.

    b. If you use 4 cups of flour, how much sugar will you need? Show your reasoning.

Converting US Units of Measurement

Name _____

Conversion factors

1 foot = 12 inches
1 yard = 3 feet
1 mile = 5280 feet
1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours

1 pound = 16 ounces
1 ton = 2000 pounds
1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

Example 1: Convert 3 yards to feet.

Start with your given units and place them over one to make it a fraction. Then multiply by unit fractions. Set up your units to cancel out. For example, if you have yards in the numerator, place yards in the denominator.

$$3 \text{ yards} = \frac{3 \text{ yards}}{1} \cdot \frac{3 \text{ feet}}{1 \text{ yard}} = 9 \text{ feet}$$

Example 2: Convert 5 days into minutes.

$$5 \text{ days} = \frac{5 \text{ days}}{1} \cdot \frac{24 \text{ hours}}{1 \text{ day}} \cdot \frac{60 \text{ minutes}}{1 \text{ hour}} = 7200 \text{ minutes}$$

Try it! Fill in the missing parts to convert 2 quarts to cups.

$$2 \text{ quarts} = \frac{2 \text{ quarts}}{1} \cdot \frac{2}{\text{quarts}} \cdot \frac{\text{cups}}{\quad} = \quad \text{cups}$$

Practice:

1. 33 yards to feet

Conversion factors

1 foot = 12 inches
1 yard = 3 feet
1 mile = 5280 feet
1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours

1 pound = 16 ounces
1 ton = 2000 pounds
1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

2. 80 ounces to pounds

3. 10,000 feet to miles

4. 128 fluid ounces to gallons

5. 2.5 tons to ounces

6. How many seconds are there in one year?

Converting Metric Units of Measurement

Name _____

Conversion factors

1 kilometer = 1000 meters
1 hectometer (hm) = 100 meters
1 dekameter (dam) = 10 meters

1 meter = 10 decimeters (dm)
1 meter = 100 centimeters (cm)
1 meter = 1000 millimeters (mm)

In the metric system you can use unit fractions or just move the decimal point. The chart below shows how many places to move the decimal point and which direction to move it.

kilo	hecto	deka	**meter** **gram** **liter**	deci	centi	milli

Example 1: Convert 10 kilometers to centimeters.

To get from kilometers to centimeters in the chart, move 5 decimal places to the right.

10 kilometers = 1,000,000 centimeters

Example 2: Convert 1000 milligrams to grams

To get from milligrams to grams in the chart, move 3 decimal places to the left.

1000 milligrams = 1 gram

Practice:

1. 400 grams to kilograms

2. 400 liters to milliliters

Conversion factors

1 kilometer = 1000 meters
1 hectometer (hm) = 100 meters
1 dekameter (dam) = 10 meters

1 meter = 10 decimeters (dm)
1 meter = 100 centimeters (cm)
1 meter = 1000 millimeters (mm)

kilo	hecto	deka	**meter** **gram** **liter**	deci	centi	milli

3. 500 milligrams to centigrams

4. 1 centimeter to meters

5. 45.5 centimeters to millimeters

6. 0.0034 milliliters to liters

7. Your child's doctor prescribed 0.0015 grams of medication once per day. Your measuring spoon is labeled with milligrams. How many milligrams of medication should you give your child?