

Unit 1

Ratio and Proportional Relationships

Essential Question

How can you use mathematics to describe change and model real-world situations?

Lesson 1: Rates

Unit Rates and Unit Cost

Objective

Students will be able to recognize proportional relationships between quantities.

Find a Unit Rate

A ratio that compares two quantities with different kinds of units is called a **rate**.

ex.

160 beats
—————

2 minutes

The unit beats and minutes are different.

When a rate is simplified so that it has a denominator of 1 unit, it is called a **unit rate**.

80 beats
—————

1 minute

The denominator is 1 unit.

Example

1. Adrienne biked 24 miles in 4 hours. If she biked at a constant speed, how many miles did she ride in one hour?

$$24 \text{ miles in 4 hours} = \frac{24 \text{ mi}}{4 \text{ hr}}$$

Write the rate as a fraction.

$$= \frac{24 \text{ mi} \div 4}{4 \text{ hr} \div 4}$$

Divide the numerator and the denominator by 4

$$= \frac{6 \text{ mi}}{1 \text{ hr}}$$

Simplify.

Adrienne biked 6 miles in one hour.

You try

Directions: Find the unit rate.

1. \$300 for 6 hours

2. 220 miles on 8 gallons

Answer

1. \$50 per hour

2. 27.5 miles per gallon

Example

2. Find the unit price if it costs \$2 for eight juice boxes.

$$\text{\$2 for eight boxes} = \frac{\text{\$2}}{8 \text{ boxes}}$$

$$= \frac{\text{\$2} \quad \div 8}{8 \text{ boxes} \quad \div 8}$$

$$= \frac{\text{\$0.25}}{1 \text{ box}}$$

You try

3. The prices of 3 different bags of dog food are given in the table. Which size bag has the lowest price per pound rounded to the nearest cent?

40-pound bag = \$1.23 per pound

20 - pound bag = \$1.17 per pound

8-pound bag = \$1.24 per pound

The 20-pound bag sells for the lowest price per pound.

Dog Food Prices	
Bag size (lb)	Price (\$)
40	49.00
20	23.44
8	9.88

Independent Practice

Directions: Find each unit rate. Round to the nearest hundredth if necessary.

1. 360 miles in 6 hours
2. 6,840 customers in 45 days
3. 43.5 meter in 13 seconds
4. \$7.40 for 5 pounds