

Section Overview



Ratios and Rates

Lessons 5-1, 5-2

Why? Ratios are used to solve proportions, to find missing lengths in similar figures, and to interpret the scale in scale drawings or scale models.

A ratio compares two numbers. A **rate** is a ratio that compares two measurement values that have different units.

A **unit rate** has a denominator of 1. The fraction bar may be read as *per* in a rate.

Denise ran 5 miles in 40 minutes.

Rate: $\frac{5 \text{ mi}}{40 \text{ min}}$ or $\frac{40 \text{ min}}{5 \text{ mi}}$

Unit Rate: $\frac{0.125 \text{ mi}}{1 \text{ min}}$ or $\frac{8 \text{ min}}{1 \text{ mi}}$

Slope and Rates of Change

Lesson 5-3

Why? Scientists use mathematical models, such as equations and functions, to describe such real-world phenomena as biological and economic systems. *Rate of change* is an important consideration in developing a mathematical model.

The slope reflects the constant rate of change for each interval on the graph.

Linear Function	Nonlinear Function
The graph of a linear function shows a constant rate of change.	The graph of a nonlinear function shows a nonlinear, or variable, rate of change.

The rate of change varies for each interval on the graph.

Proportions and Customary Measures

Lessons 5-4, 5-5, 5-6

Why? Customary units of measure are commonly used in the United States.

Common Customary Measurements		
Length	Weight	Capacity
1 foot = 12 inches	1 pound = 16 ounces	1 cup = 8 fluid ounces
1 yard = 36 inches	1 ton = 2,000 pounds	1 pint = 2 cups
1 yard = 3 feet		1 quart = 2 pints
1 mile = 5,280 feet		1 quart = 4 cups
1 mile = 1,760 yards		1 gallon = 4 quarts
		1 gallon = 16 cups
		1 gallon = 128 fluid ounces

Proportions can be used to convert units within the customary system.

Convert 4 yards to feet.

$$\frac{1 \text{ yd}}{3 \text{ ft}} = \frac{4 \text{ yd}}{x \text{ ft}}$$

$$1 \cdot x = 3 \cdot 4$$

$$x = 12$$

So 4 yards is 12 feet.