

7-7**Scale Drawings and Models****Target:** Use proportions to find distances.

Scale Models A scale model or a scale drawing is an object or drawing with lengths proportional to the object it represents. The scale of a model or drawing is the ratio of the length of the model or drawing to the actual length of the object being modeled or drawn.

Example

MAPS The scale on the map shown is 0.75 inches : 6 miles. Find the actual distance from Pineham to Menlo Fields.

Use a ruler. The distance between Pineham and Menlo Fields is about $1\frac{1}{16}$ or 1.0625 inches.

Method 1: Write and solve a proportion.

Let x represent the distance between cities.

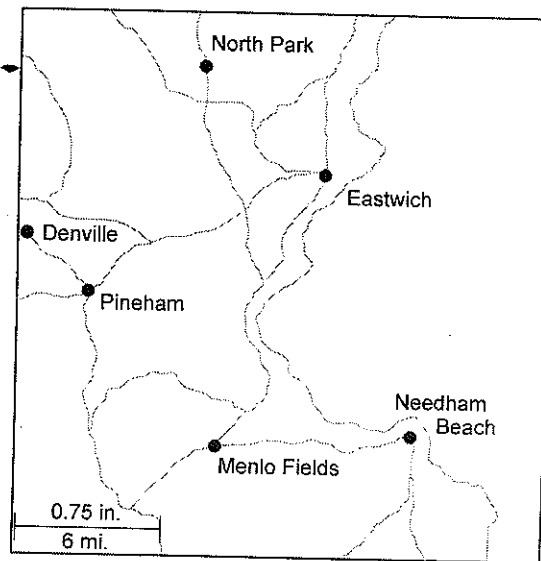
$$\begin{array}{rcl} \frac{0.75 \text{ in.}}{6 \text{ mi}} = \frac{1.0625 \text{ in.}}{x \text{ mi}} & \leftarrow \text{map} & \\ & \leftarrow \text{actual} & \\ 0.75 \cdot x = 6 \cdot 1.0625 & \text{Cross Products Property} & \\ x = 8.5 & \text{Simplify.} & \end{array}$$

Method 2: Write and solve an equation.

Let a = actual distance and m = map distance in inches. Write the scale as $\frac{6 \text{ mi}}{0.75 \text{ in.}}$, which is $6 \div 0.75$ or 8 miles per inch.

$$\begin{array}{rcl} a = 8 \cdot m & \text{Write an equation.} & \\ = 8 \cdot 1.0625 & m = 1.0625 \text{ in.} & \\ = 8.5 & \text{Solve.} & \end{array}$$

The distance between Pineham and Menlo Fields is 8.5 miles.

**Exercises**

Use the map above and a customary ruler to find the actual distance between each pair of cities. Measure to the nearest sixteenth of an inch.

1. Eastwich and Needham Beach 12 miles

2. North Park and Menlo Fields 16 miles

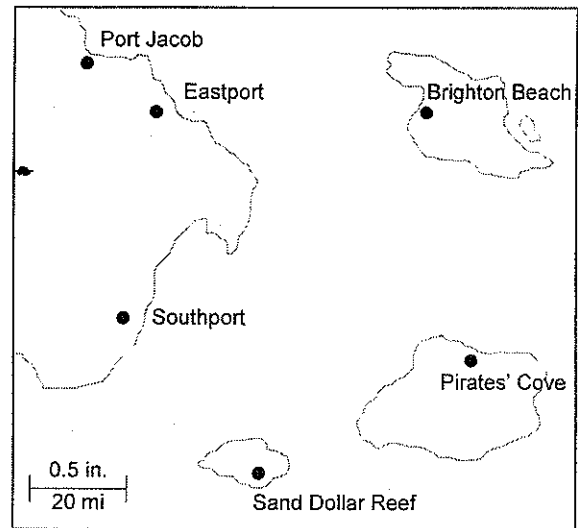
3. North Park and Eastwich 6.5 mi

4. Denville and Pineham 3.5 mi

5. Pineham and Eastwich 11 mi

7-7**Skills Practice****Scale Drawings and Models**

MAPS Use the map shown and a customary ruler to find the actual distance between each pair of cities. Measure to the nearest sixteenth of an inch.



1. Port Jacob and Southport

52.5 mi

2. Port Jacob and Brighton Beach

72.5 mi

3. Brighton Beach and Pirates' Cove

52.5 mi

4. Eastport and Sand Dollar Reef

77.5 mi

5. **SCALE MODEL** Sanjay is making a 139 centimeters long scale model of the Parthenon for his World History class. The actual length of the Parthenon is 69.5 meters long.

a. What is the scale of the model? 2 cm / m

b. How many times as long as the actual Parthenon is the model?

$\frac{1}{50}$

6. **ARCHITECTURE** An architect is making a scale model of an office building he wishes to construct. The model is 9 inches tall. The actual office building he plans to construct will be 75 feet tall.

a. What is the scale of the model? 3 in 25 ft

b. What scale factor did the architect use to build his model?

1:100

7. **WHITE HOUSE** Craig is making a scale drawing of the White House on an 8.5-by-11-inch sheet of paper. The White House is 168 feet long and 152 feet wide. Choose an appropriate scale for the drawing and use that scale to determine the drawing's dimensions.

1 in : 18 ft $8\frac{4}{9}$ in \times $9\frac{1}{3}$ in

8. **GEOGRAPHY** Choose an appropriate scale and construct a scale drawing of each rectangular state to fit on a 4-by-6-inch index card.

a. The state of Colorado is approximately 380 miles long (east to west) and 280 miles wide (north to south).

1 in : 80 mi 4.75 in \times 3.5 in

b. The state of Wyoming is approximately 365 miles long (east to west) and 265 miles wide (north to south).

1 in : 75 mi 4.87 in \times 3.53 in