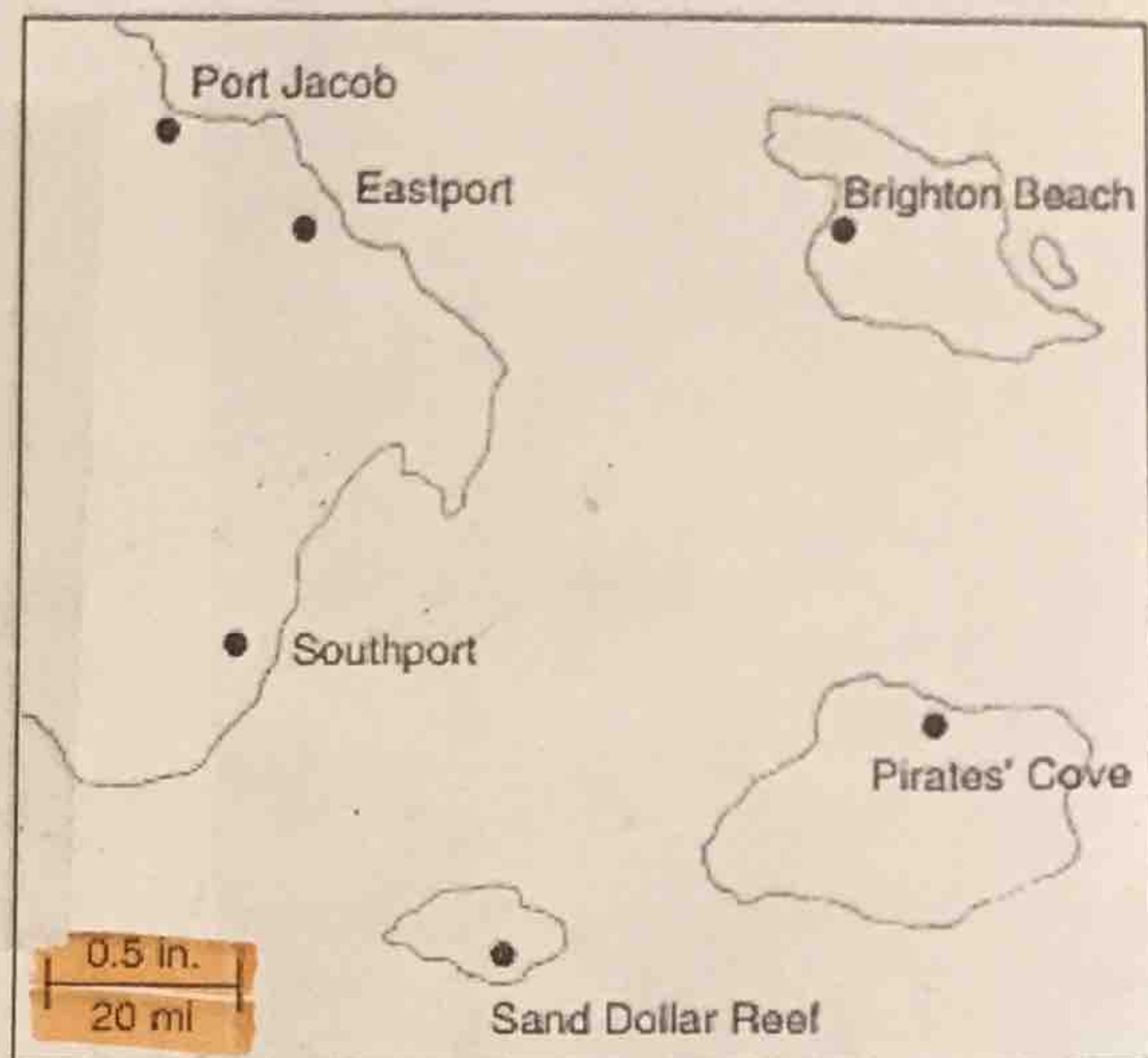


9.7 Scale Models & Drawings

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
2. Port Jacob and Brighton Beach
3. Brighton Beach and Pirates' Cove
4. Eastport and Sand Dollar Reef



$$0.5 \text{ in.} = 20 \text{ mi}$$

$$x = 50$$

50 miles

$$x = 77.5$$

77.5 miles

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?
 - b. How many times as long as the actual Parthenon is the model?
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?
 - b. What scale factor did the architect use to build his model?

$$6a. \frac{\text{model length}}{\text{actual length}} = \frac{9 \text{ in}}{75 \text{ ft}}$$

$$= 9 \text{ in} : 75 \text{ ft} \text{ or } 3 \text{ in} : 25 \text{ ft}$$

$$6b. \frac{3 \text{ in}}{25 \text{ ft}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = \frac{3}{300} = \frac{1}{100}$$

the architect used a scale factor of $\frac{1}{100}$ to build his model

9.7 Scale Models & Drawings

$$\begin{aligned} 1. \quad & \frac{1 \frac{5}{16} \text{ in}}{0.5 \text{ in}} = \frac{1.3125 \text{ in}}{X \text{ mi}} \\ & \frac{20 \text{ mi}}{0.5 \text{ in}} = \frac{1.3125 \text{ in}}{X \text{ mi}} \\ & 0.5X = 20(1.3125) \\ & 0.5X = 26.25 \\ & X = 52.5 \\ & \mathbf{52.5 \text{ miles}} \end{aligned}$$

$$\begin{aligned} 2. \quad & \frac{1 \frac{15}{16} \text{ in}}{0.5 \text{ in}} = \frac{1.9375 \text{ in}}{X \text{ mi}} \\ & \frac{20 \text{ mi}}{0.5 \text{ in}} = \frac{1.9375 \text{ in}}{X \text{ mi}} \\ & 0.5X = 20(1.9375) \\ & 0.5X = 38.75 \\ & X = 77.5 \\ & \mathbf{77.5 \text{ miles}} \end{aligned}$$

$$\begin{aligned} 3. \quad & \frac{1 \frac{1}{4} \text{ in}}{0.5 \text{ in}} = \frac{1.25 \text{ in}}{X \text{ mi}} \\ & \frac{20 \text{ mi}}{0.5 \text{ in}} = \frac{1.25 \text{ in}}{X \text{ mi}} \\ & 0.5X = 20(1.25) \\ & 0.5X = 25 \\ & X = 50 \\ & \mathbf{50 \text{ miles}} \end{aligned}$$

$$\begin{aligned} 4. \quad & \frac{1 \frac{15}{16} \text{ in}}{0.5 \text{ in}} = \frac{1.9375 \text{ in}}{X \text{ mi}} \\ & \frac{20 \text{ mi}}{0.5 \text{ in}} = \frac{1.9375 \text{ in}}{X \text{ mi}} \\ & 0.5X = 20(1.9375) \\ & 0.5X = 38.75 \\ & X = 77.5 \\ & \mathbf{77.5 \text{ miles}} \end{aligned}$$

$$5a. \quad \frac{\text{model length}}{\text{actual length}} = \frac{139 \text{ cm}}{69.5 \text{ m}} = \mathbf{139 \text{ cm} : 69.5 \text{ m}} \text{ or } \mathbf{2 \text{ cm} : 1 \text{ m}}$$

$$5b. \quad \frac{139 \text{ cm}}{69.5 \text{ m}} \cdot \frac{1 \text{ m}}{100 \text{ cm}} = \frac{139}{6950} = \frac{1}{50} \text{ or } \frac{2 \text{ cm}}{1 \text{ m}} = \frac{1 \text{ m}}{100 \text{ cm}} = \frac{2}{100} = \frac{1}{50}$$

the model is $\frac{1}{50}$ as long as the Parthenon.

$$6a. \quad \frac{\text{model length}}{\text{actual length}} = \frac{9 \text{ in}}{75 \text{ ft}} = \mathbf{9 \text{ in} : 75 \text{ ft}} \text{ or } \mathbf{3 \text{ in} : 25 \text{ ft}}$$

$$6b. \quad \frac{3 \text{ in}}{25 \text{ ft}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = \frac{3}{300} = \frac{1}{100}$$

the architect used a scale factor of $\frac{1}{100}$ to build his model.