

Section Overview

Similar Figures and Indirect Measurement

Lessons 5-5, 5-6

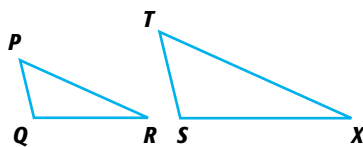
Why? Similar figures, dilations, and scale drawings are used in blueprints for construction, photography, medical research, and many other applications.

Similar figures have congruent angles and proportional sides.

Indirect Measurement

The triangle formed by the height of the man and his shadow and the similar triangle formed by the height of the building and its shadow are similar. Find the height of the building.

Similar Figures



$$\angle Q \cong \angle S$$

$$\angle P \cong \angle T$$

$$\angle R \cong \angle X$$

$$\frac{PQ}{TS} = \frac{RP}{XT} = \frac{QR}{SX}$$

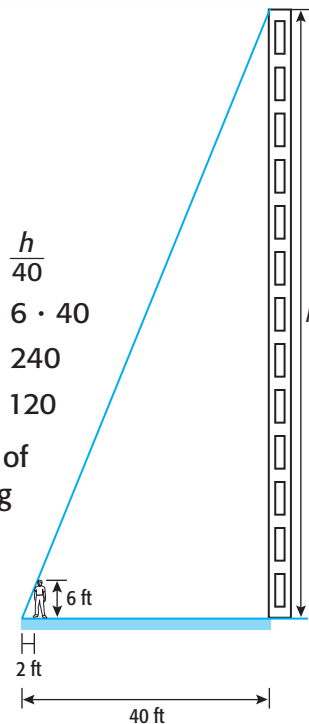
$$\frac{6}{2} = \frac{h}{40}$$

$$2 \cdot h = 6 \cdot 40$$

$$2 \cdot h = 240$$

$$h = 120$$

The height of the building is 120 ft.



Scale Drawings and Scale Models

Lesson 5-7

Why? A scale drawing is a two-dimensional drawing of an object that is proportional to the object. A scale model is a three-dimensional model that is proportional to the object.

Scale Drawings

A **scale** is a ratio between two sets of measurements.

The scale on a map is 1 in. = 50 mi.

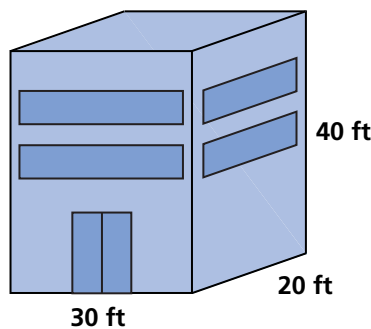
If the map measurement between two points on a map is 4.5 in., what is the actual distance?

$$\frac{1}{50} = \frac{4.5}{d}$$

$$d = 50 \cdot 4.5$$

$$d = 225$$

The actual distance is 225 miles.



Scale: 2 in. = 5 ft

Scale Models

scale

scale factor

$$\begin{array}{l} \text{model} \rightarrow 2 \text{ in.} \\ \text{building} \rightarrow 5 \text{ ft} \end{array} = \frac{2 \text{ in.}}{60 \text{ in.}} = \frac{1}{30}$$

The height of the building is 40 ft, or 480 inches. To find the height of the model, solve a proportion.

$$\frac{1}{30} = \frac{h \text{ in.}}{480 \text{ in.}}$$

$$h = 16 \text{ in.}$$