

Example 2 Find the scale**MODEL CARS** A model car is 8 inches long. If the actual car is 20 feet long, what is the scale of the model?

Let x represent the actual length of the car. Write and solve a proportion to find the scale of the model.

Length of Car

model \rightarrow $\frac{8 \text{ in.}}{20 \text{ ft}} = \frac{1 \text{ in.}}{x \text{ ft}}$

actual \rightarrow $\frac{8 \cdot x = 20 \cdot 1$

$$\frac{8x}{8} = \frac{20}{8}$$

$$x = 2\frac{1}{2}$$

Scale \leftarrow model \leftarrow actual

Find the cross products.

Multiply. Then divide each side by 8.

Simplify.

So, the scale is 1 inch = $2\frac{1}{2}$ feet.

Example 3 Find the Scale Factor**Find the scale factor for the model car in Example 2.**

$$\frac{1 \text{ in.}}{2\frac{1}{2} \text{ ft}} = \frac{1 \text{ in.}}{30 \text{ in.}}$$

Convert 2.5 feet to inches.

The scale factor is $\frac{1}{30}$ or 1 : 30. This means that the model car is $\frac{1}{30}$ the size of the actual car.

Example 4 Real-World Example

HOBBIES Thayer is making a model of a Victorian Mansion she recently visited. The height of the house is 50 feet tall. She wants her model to be no taller than 12 inches. Choose an appropriate scale and use it to determine how tall she should make the model of the entry door that is 10 feet tall.

Try a scale of 1 inch = 5 feet.

$$\begin{array}{ll} \frac{1 \text{ in.}}{5 \text{ ft}} = \frac{x \text{ in.}}{50 \text{ ft}} & \leftarrow \text{model} \\ & \leftarrow \text{actual} \\ 1 \cdot 50 = 5 \cdot x & \text{Find the cross products.} \\ 50 = 5x & \text{Multiply.} \\ 10 = x & \text{Divide each side by 5.} \end{array}$$

Using this scale, the model of the house would be 10 inches tall.

Use this scale to find the height of the entry door.

$$\begin{array}{ll} \frac{1 \text{ in.}}{5 \text{ ft}} = \frac{y \text{ in.}}{10 \text{ ft}} & \\ 1 \cdot 10 = 5 \cdot y & \text{Find the cross products.} \\ 10 = 5y & \text{Multiply.} \\ 2 = y & \text{Divide each side by 5.} \end{array}$$

The entry door is 2 inches tall.