

## Lesson 13-6

## Example 1

Write an equation in which  $y$  varies inversely as  $x$  if one pair of values is  $y = 320$  and  $x = 0.5$ .

## Solution

$$y = \frac{k}{x} \quad \text{Substitute in the equation for inverse variation.}$$

$$320 = \frac{k}{0.5}$$

$$320 \cdot 0.5 = k$$

$$160 = k \quad \text{Solve for } k.$$

The equation is  $y = \frac{160}{x}$ .

## Example 2

**ASTRONOMY** At its greatest distance from the sun, an asteroid travels a certain distance in 30 minutes while traveling at 280 mi/h. How long would it take the asteroid to travel the same distance, traveling at 350 mi/h?

## Solution

$$y = \frac{k}{x} \quad \text{Find an equation.}$$

$$30 = \frac{k}{280}$$

$$30(280) = k$$

$$8400 = k$$

$$y = \frac{8400}{x}$$

$$y = \frac{8400}{350} \quad \text{Substitute 350 into the equation.}$$

$$y = 24 \quad \text{Solve for } y.$$

The trip will take 24 minutes traveling at 350 mi/h.

**Example 3**

**PHYSICS** The brightness of a light bulb varies inversely as the square of the distance from the source. If a light bulb has a brightness of 300 lumens at 3 ft, what will be its brightness at 30 ft?

**Solution**

$$\begin{array}{ll} x^2y = k & \text{Substitute the know values into the} \\ (3)^2(300) = k & \text{equation for inverse variation.} \\ (9)(300) = k & \\ 2700 = k & \text{Solve.} \\ x^2y = 2700 & \text{Write the equation.} \\ (30)^2y = 2700 & \text{Substitute 30 for } x. \\ 900y = 2700 & \\ y = 3 & \text{Solve.} \end{array}$$

At 30 feet, the brightness will be 3 lumens.