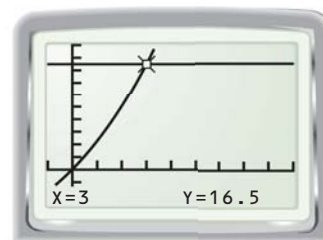


METHOD 2**Using a Graph** Another approach is to use a graph.**STEP 1 Write** an equation for the area of the banner. The area of the banner can be thought of as the area of a triangle plus the area of a rectangle.

Area of banner = Area of triangle + Area of rectangle

$$A = \frac{1}{2}w^2 + 4w$$

STEP 2 Graph the equation for the area of the banner using a graphing calculator. Graph $y_1 = 0.5x^2 + 4x$. Because you are looking for the value of x that gives an area of 16.5 square feet, you should display the graph of $y_2 = 16.5$ in the same viewing window.**STEP 3 Find** the intersection of the graphs by using the *intersect* feature on your calculator. The graphs intersect at (3, 16.5).

▶ The width of the banner is 3 feet.

PRACTICE

1. **COUNTER DESIGN** A contractor is building a counter in a kitchen using the diagram shown. The countertop will have an area of 12 square feet. How wide should it be? Solve this problem using two different methods.



2. **ERROR ANALYSIS** Describe and correct the error in using an equation to solve the problem in Exercise 1.

$$12 = 4w + \frac{1}{2}w^2 + \frac{1}{2}w^2$$

$$0 = w^2 + 4w - 12$$

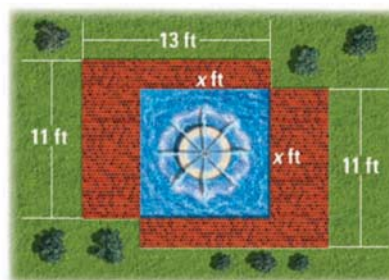
$$0 = (w + 2)(w - 6)$$

$$w + 2 = 0 \quad \text{or} \quad w - 6 = 0$$

$$w = -2 \quad \text{or} \quad w = 6$$

The width is 6 feet.

3. **FOUNTAIN DESIGN** A square fountain in a city plaza is surrounded by brick patios as shown. The combined area of the fountain and brick patios is 205 square feet. What is the side length of the fountain? Solve this problem using two different methods.



4. **WHAT IF?** You want to make a larger banner using the same pattern shown in the problem on page 585. The new banner will have an area of 24 square feet. Find the width of the new banner. Describe the method you used to find your answer.