9-2 Practice

Solving Quadratic Equations by Graphing

Solve each equation by graphing.

1. \(x^2 - 5x + 6 = 0\)

\[\text{Graph 1} \]

2. \(2w^2 + 6w + 9 = 0\)

\[\text{Graph 2} \]

3. \(b^2 - 3b + 4 = 0\)

\[\text{Graph 3} \]

Solve each equation by graphing. If integral roots cannot be found, estimate the roots to the nearest tenth.

4. \(p^2 + 4p = 3\)

\[\text{Graph 4} \]

5. \(2m^2 + 5 = 10m\)

\[\text{Graph 5} \]

6. \(2x^2 + 8x = -7\)

\[\text{Graph 6} \]

7. NUMBER THEORY Two numbers have a sum of 2 and a product of 8. The quadratic equation \(-n^2 + 2n + 8 = 0\) can be used to determine the two numbers.

a. Graph the related function \(f(n) = -n^2 + 2n + 8\) and determine its \(x\)-intercepts. \(-2, 4\)

b. What are the two numbers? \(-2\) and \(4\)

8. DESIGN A footbridge is suspended from a parabolic support. The function \(h(x) = -\frac{1}{25}x^2 + 9\) represents the height in feet of the support above the walkway, where \(x = 0\) represents the midpoint of the bridge.

a. Graph the function and determine its \(x\)-intercepts. \(-15, 15\)

b. What is the length of the walkway between the two supports? \(30\) ft

9-2 Word Problem Practice

Solving Quadratic Equations by Graphing

1. FARMING In order for Mr. Moore to decide how much fertilizer to apply to his corn crop this year, he reviews records from previous years. His crop yield depends on the amount of fertilizer he applies to his fields. Let length = \(30 - w\). Explain. Yes; solving the equation \((30 - w)w = 81\) gives \(w = 3\) or 27. A 3 in. by 27 in. sheet of paper has area 81 in\(^2\) and perimeter 60 in.

2. LIGHT Aysha and Jeremy hold a flashlight so that the light falls on a piece of graph paper in the shape of a parabola. Aysha and Jeremy sketch the shape of the parabola and find that the equation \(y = -x^2 + 4x + 12\) matches the shape of the light beam. Determine the zeros of the function. \(-2\) and \(5\)

3. FRAMING A rectangular photograph is 7 inches long and 6 inches wide. The photograph is framed using a material that is 2 inches wide. The area of the frame and photograph combined is 156 square inches. What is the width of the framing material? \(3\) in.

4. WRAPPING PAPER Can a rectangular piece of wrapping paper with an area of 81 square inches have a perimeter of 60 inches? (Hint: Let length = 30 - \(w\).) Explain. Yes; solving the equation \((30 - w)w = 81\) gives \(w = 3\) or 27. A 3 in. by 27 in. sheet of paper has area 81 in\(^2\) and perimeter 60 in.

5. ENGINEERING The shape of a satellite dish is often parabolic because of the reflective qualities of parabolas. Suppose a particular satellite dish is modeled by the following equation. \(0.5x^2 = 2 + y\)

a. Approximate the zeros of this function by graphing. \(-2 + 2\) and \(2\)

b. On the coordinate plane above, translate the parabola so that there is only one zero. Label this curve A. See students’ work.

c. Translate the parabola so that there are no zeros. Label this curve B. See students’ work.