

Algebra II Worksheet #8 Unit 6 Selected Solutions

Write a second degree equation in one variable to solve each of the following problems. Express irrational solutions rounded to the nearest tenth.

3. One number is 2 less than 5 times another. Their product is 50. What are the numbers?

$$\begin{aligned} \text{first: } x & & x(5x - 2) &= 50 \\ \text{second: } 5x - 2 & & 5x^2 - 2x &= 50 \\ & & 5x^2 - 2x - 50 &= 0 \\ & & x &= \frac{2 \pm \sqrt{1004}}{10} \\ & & x &\approx 3.4 \quad \text{or} \quad x \approx -3.0 \\ & & 5x - 2 &\approx 14.8 \quad 5x - 2 \approx -16.8 \end{aligned}$$

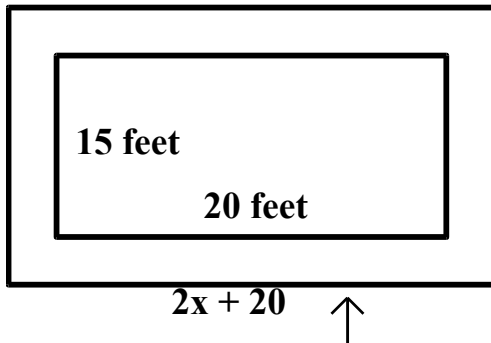
The numbers are about 3.4 and 14.8 or -3.0 and -16.8

6. The area of a rectangle is 15 square inches. Find its dimensions if its length is 1 inch more than twice its width.

$$\begin{aligned} \text{Width: } x \text{ inches} & & x(2x + 1) &= 15 \\ \text{Length: } 2x + 1 & & 2x^2 + x &= 15 \\ & & 2x^2 + x - 15 &= 0 \\ & & (2x - 5)(x + 3) &= 0 \\ & & x = 5/2 \text{ or } x = -3 & \\ & & 2x + 1 = 6 & \end{aligned}$$

The rectangle is 6 inches long and 2.5 inches wide.

9. A rectangular garden that is 20 feet long and 15 feet wide is surrounded by a path of uniform width. Find the width of the path if its area is 200 square feet.



Let x represent the width of the path.

$$\begin{aligned} (2x + 20)(2x + 15) &= 500 \\ 2x + 15 & & 4x^2 + 70x + 300 &= 500 \\ & & 4x^2 + 70x - 200 &= 0 \\ & & 2x^2 + 35x - 100 &= 0 \\ & & (2x - 5)(x + 20) &= 0 \\ & & x = 2.5 \text{ or } x = \cancel{-20} & \end{aligned}$$

The area of the large rectangle is equal to the area of the garden plus the area of the path = $300 + 200 = 500$ square feet.

The path is 2.5 feet wide.