Algebra II   Worksheet #9   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. The sum of a number and its square is 8. What is the number?

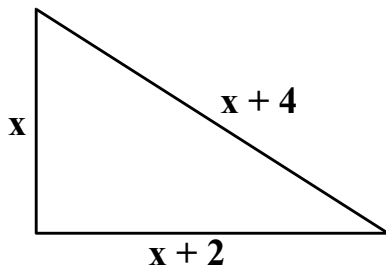Let x represent the number. $x + x^2 = 8$

$$x^2 + x = 8$$
$$x^2 + x - 8 = 0$$
$$x = \frac{-1 \pm \sqrt{33}}{2}$$
$$x \approx 2.4 \quad \text{or} \quad x \approx -3.4$$

The number is about 2.4 or about -3.4.

7. The length of one leg of a right triangle is 2 inches more than the length of the other leg. The length of the hypotenuse is 4 inches more than the length of the shorter leg. How long is each side of the triangle.

$$x^2 + (x + 2)^2 = (x + 4)^2$$
$$x^2 + x^2 + 4x + 4 = x^2 + 8x + 16$$
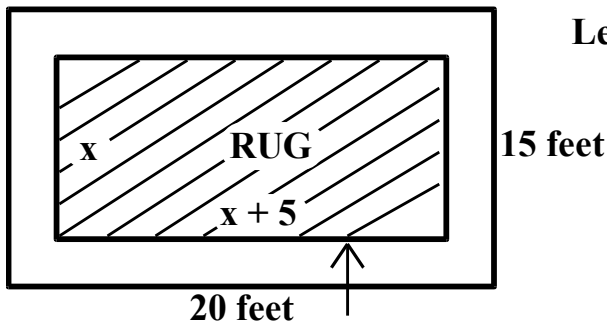$$x^2 - 4x - 12 = 0$$
$$(x - 6)(x + 2) = 0$$
$$x = 6 \text{ or } x \cancel{=} -2$$
$$x + 2 = 8$$
$$x + 4 = 10$$

The lengths are 6 inches, 8 inches, and 10 inches.

9. Find the dimensions of a rug that covers 68% of the floor of a room that is 20 feet long and 15 feet wide if the edges of the rug are equidistant from the walls.

Let x represent the width of the rug..

$$x(x + 5) = 204$$
$$x^2 + 5x = 204$$
$$x^2 + 5x - 204 = 0$$
$$(x - 12)(x + 17) = 0$$
$$x = 12 \text{ or } x \cancel{= -17}$$
$$x + 5 = 17$$

The area of the rug, the smaller rectangle, is 68 percent of the area of the room which is $(.68)(300) = 204$ square feet.

The rug is 17 feet long and 12 feet wide.