

Worded problems in this chapter will be solved using quadratic equations.

Example: A rectangle has a length that is 3ft longer than its width. The area of the rectangle is 18ft. Find the width and length.

We will first define the variable information and start with the information, which is the most unknown. The width is the most unknown.

Let x = the width of the rectangle in ft.

Let $x + 3$ = the length of the rectangle in ft.

(Note: Area of a rectangle is length times width so we will set up an equation.)

length width area
↓ ↓ ↓
 $(x + 3)(x) = 18$

Now we will solve the equation.

$$\begin{aligned}(x + 3)(x) &= 18 \\ x^2 + 3x &= 18 \\ x^2 + 3x - 18 &= 0 \\ (x + 6)(x - 3) &= 0\end{aligned}$$

$$\begin{array}{ll} x + 6 = 0 & \text{or} \quad x - 3 = 0 \\ x + 6 - 6 = 0 - 6 & \text{or} \quad x - 3 + 3 = 0 + 3 \\ x = -6 & \text{or} \quad x = 3\end{array}$$

We are finding a dimension so the negative value is not used. We only use the positive 3.

Since x is 3, that is the width in feet, then the length is $x + 3$ which will be 6, the length in feet.

We will summarize with a sentence.

The width of the rectangle is three feet and the length of the rectangle is six feet.