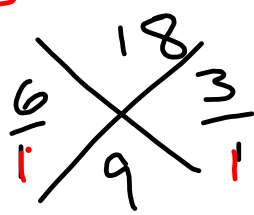


Bellwork: Factor the equation

$$\begin{aligned}
 & (-3)^2 + 9(-3) + 18 \\
 & 1x^2 + 9x + 18 = 0 \qquad 9 - 27 + 18 = 0 \\
 & (x + 6)(x + 3) = 0 \\
 & x = -6, -3
 \end{aligned}$$


## Lesson 4.1 Objectives

I can solve quadratic functions by factoring

**ZERO PRODUCT PROPERTY:** If  $ab=0$ , then  $a=0$  or  $b=0$ .

**USING THE ZERO PRODUCT PROPERTY TO SOLVE QUADRATIC EQUATIONS**

Step 1: Set the equation equal to zero (move everything to one side).

Step 2: Factor completely.

Step 3: Set each factor equal to zero.

Step 4: Solve each equation for  $x$ .

**USING THE ZERO PRODUCT PROPERTY TO SOLVE QUADRATIC EQUATIONS**

$$x^2 + 4x - 5 = 0$$

$$(x + 5)(x - 1) = 0$$

Step 1: Set the equation equal to zero (move everything to one side).

Step 2: Factor completely.

Step 3: Set each factor equal to zero.

Step 4: Solve each equation for  $x$ .

$$x + 5 = 0$$

~~-5~~     ~~-5~~

$$x = -5$$

or

$$x - 1 = 0$$

~~+1~~     ~~+1~~

$$x = 1$$

①  $(2x-5)(x+7)=0$

$$2x - \cancel{5} = 0$$

$+5 \quad +5$

$$\cancel{2}x = \frac{5}{\cancel{2}}$$

$$x+7=0$$

$$x = -7$$

$$x = 5/2$$

②  $x^2 + 13x + 40 = 0$

$$(x+8)(x+5) = 0$$

$$x = -8, -5$$

$$x + \cancel{8} = 0$$

$-8 \quad -8$

$$x = -8$$

$$x+5=0$$

3.  $2x^2 - 3x + 5 = x^2 + 6x - 2$   
 ~~$-x^2 - 5x + 7 = x^2 + 6x - 2$~~

★ Keep  $x^2$  positive

$$x^2 - 8x + 7 = 0$$

$$(x-1)(x-7) = 0$$

$$x = 1, 7$$

4.  $3x^2 - 7x = 0$

$$x = \frac{7}{3} \quad \underline{x = 0}$$

$$\underline{x}(\underline{3x - 7}) = 0$$

$$\underline{3x - 7} = 0$$

$$+7 \quad +7$$

$$\underline{3x} = 7$$

$$\underline{\frac{1}{3}} \quad \underline{\frac{1}{3}}$$

5.  $4x^2 - 9 = 0$

$$(2x + 3)(2x - 3) = 0$$

$$2x + 3 = 0$$

~~-3~~   -3

$$2x - 3 = 0$$

~~+3~~   +3

$$2x = -3$$

~~2~~   2

$$2x = 3$$

~~2~~   2

$$x = -\frac{3}{2}, \frac{3}{2}$$

6.  $x^2 = 10x - 25$

~~-10x~~   ~~-10x~~   ~~+25~~  
+25

$$x^2 - 10x + 25 = 0$$

$$(x - 5)(x - 5) = 0$$

$$x = 5$$

7. Find the x-intercepts of the function.

$$f(x) = x^2 + 5x - 6$$

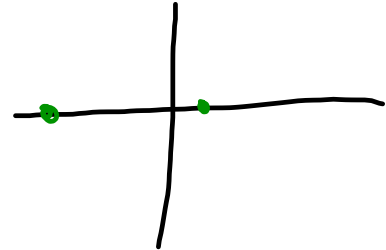
$$0 = x^2 + 5x - 6$$

$$0 = (x-1)(x+6)$$

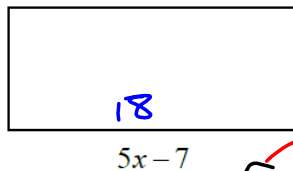
$$x = 1, -6$$

$$(1, 0) (-6, 0)$$

(x, y)



8. What are the dimensions of the rectangle if the area = 108 cm<sup>2</sup>?  $bh = A$



$$(5x-7)(x+1) = 108$$

$$5x^2 + 5x - 7x - 7 = 108$$

$$5x^2 - 2x - 115 = 0$$

$$\begin{array}{r} -25 \quad -575 \\ \hline 5 \end{array} \quad \begin{array}{r} 23 \\ \hline 5 \end{array}$$

$$x = 5, -23/5$$

$$\begin{array}{r} -5 \quad 23 \\ \hline 1 \quad 5 \end{array}$$

$$(x-5)(5x+23) = 0$$

$$5x + 23 = 0$$

$$-23 \quad -23$$

$$\hline 5x = -23$$

$$\frac{5x}{5} = \frac{-23}{5}$$