

# Warmup

## Factor

①  $8x^2 - 73x + 9$

②  $4x^2 + 16x + 12$

Solve by factoring ③  $2x^2 - 11x - 21 = 0$

## Completing the Square Graphic Organizer

$$x^2 + 6x + \cancel{7} = 0$$

~~-7~~   ~~-7~~

$$x^2 + 6x + \frac{(3)^2}{2} = -7 + 9$$

$$\begin{array}{c} \wedge \\ x \quad x \\ \frac{6x}{2} \quad \frac{(3)^2}{3 \quad 3} \\ (3)^2 = 9 \end{array}$$

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

$$\sqrt{(x+3)^2} = \sqrt{2}$$

$$x + \cancel{3} = \pm \sqrt{2}$$

~~-3~~   ~~-3~~

$$x = -3 \pm \sqrt{2}$$

**Step 1:** move the constant to the other side of the equal sign

**Step 2:** divide the middle term (b) by 2, square that number, and then add that number to both sides of the equation

**Step 3:** “cheat” factor and simplify the right side of the equation

**Step 4:** take the square root of both sides  
Reminder – square root has + and -

**Step 5:** solve for x

Let's try some more.

1.  $x^2 - 2x - 15 = 0$

$$x^2 - 2x + \frac{(-1)^2}{2} = 15 + \frac{1}{2}$$

$(-1)^2 = 1$

$$(x-1)(x-1) = 16$$

$$\sqrt{(x-1)^2} = \sqrt{16}$$

$$x-1 = \pm 4$$

$$x = 1 \pm 4$$

1+4 = 5, 1-4 = -3

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

$$x^2 + 2x + \frac{(1)^2}{2} = 8 + \frac{1}{2}$$

$(1)^2 = 1$

$$(x+1)(x+1) = 9$$

$$\sqrt{(x+1)^2} = \sqrt{9}$$

$$x+1 = \pm 3$$

$$x = -1 \pm 3$$

-1+3 = 2, -1-3 = -4

3.  $x^2 - 2x + 1 = 2$

$$x^2 - 2x + \frac{(-1)^2}{2} = 3 + \frac{1}{2}$$

$(-1)^2 = 1$

$$(x-1)(x-1) = 4$$

$$\sqrt{(x-1)^2} = \sqrt{4}$$

$$x-1 = \pm 2$$

$$x = 1 \pm 2$$

1+2 = 3, 1-2 = -1

4.  $x^2 + 3x = 40$

$$x^2 + 3x + \frac{(1.5)^2}{2} = 40 + \frac{2.25}{2}$$

$(1.5)^2 = 2.25$

$$(x+1.5)(x+1.5) = 42.25$$

$$\sqrt{(x+1.5)^2} = \sqrt{42.25}$$

$$x+1.5 = \pm 6.5$$

$$x = -1.5 \pm 6.5$$

-1.5+6.5 = 5, -1.5-6.5 = -8

5.  $7x^2 + 14x + 24 = 9$

$$\frac{7x^2 + 14x}{7} = -15$$

$$7(x^2 + 2x + \frac{(1)^2}{2}) = -15 + \frac{7(1)}{2}$$

$(1)^2 = 1$

$$7(x+1)(x+1) = -8$$

$$\sqrt{7(x+1)^2} = \sqrt{-\frac{8}{7}}$$

\*cannot take square root of negative #

No Solution

6.  $6x^2 - 12x - 90 = 0$

$$\frac{6x^2 - 12x}{6} = 90$$

$$6(x^2 - 2x + \frac{(1)^2}{2}) = 90 + \frac{6(1)}{2}$$

$(-1)^2 = 1$

$$6(x-1)(x-1) = 96$$

$$\sqrt{6(x-1)^2} = \sqrt{16}$$

$$x-1 = \pm 4$$

$$x = 1 \pm 4$$

1+4 = 5, 1-4 = -3