

### Solve Quadratics by Completing the Square

The quadratic is not factorable but we are going to force it to be a perfect square trinomial.

Steps to Complete the Square:

1. Move constant to one side and the terms with variables on the other.

2. Then, **Do Something Awesome**
  3. Factor **Divide**
  4. Solve **by 2**
- d  
d to both sides

Solve by Completing the Square.

DSA

$$x^2 + 16x - 100 = -3$$

$$\quad \quad \quad +100 \quad +100$$

$$x^2 + 16x = 97$$

$$\quad \quad \quad +64 \quad +64$$

$$x^2 + 16x + 64 = 161$$

$$\sqrt{(x+8)^2} = \sqrt{161}$$

$$x+8 = \pm\sqrt{161}$$

$$\quad \quad \quad -8 \quad \quad -8$$

$x = -8 \pm \sqrt{161}$

$$8x^2 - 16x - 88 = 7x^2$$

$$\quad \quad \quad -7x^2 \quad \quad \quad +88 \quad -7x^2 + 88$$

$$x^2 - 16x = 88$$

$$\quad \quad \quad +64 \quad +64$$

$$x^2 - 16x + 64 = 152$$

$$\sqrt{(x-8)^2} = \sqrt{152}$$

$$x-8 = \pm 2\sqrt{38}$$

$$\quad \quad \quad +8 \quad +8$$

$x = 8 \pm 2\sqrt{38}$

$$m^2 - 12m - 47 = -2$$

$$m^2 - 12m = 45$$

$$m^2 - 12m + 36 = 45 + 36$$

$$\sqrt{(m-6)^2} = \sqrt{81}$$

$$m-6 = \pm 9$$

$$\quad \quad \quad +6 \quad +6$$

$m = 15, -3$

$$\left(\frac{16}{2}\right)^2 = 8^2 = 64$$

$$k^2 + 4k - 56 = 10$$

$$\quad \quad \quad +56 \quad +56$$

$$\left(\frac{4}{2}\right)^2 = 4$$

$$k^2 + 4k = 66$$

$$\quad \quad \quad +4 \quad +4$$

$$k^2 + 4k + 4 = 70$$

$$\sqrt{(k+2)^2} = \sqrt{70}$$

$$k+2 = \pm\sqrt{70}$$

$$\quad \quad \quad -2 \quad -2$$

$k = -2 \pm \sqrt{70}$

$$152$$

$$\begin{array}{r} \diagup \quad \diagdown \\ 2 \quad 76 \\ \quad \quad \quad \diagup \quad \diagdown \\ \quad \quad \quad 38 \quad 2 \\ \quad \quad \quad \quad \quad \quad \diagup \quad \diagdown \\ \quad \quad \quad \quad \quad \quad 19 \end{array}$$

$$m^2 + 6m - 4 = 0$$

$$m^2 + 6m = 4$$

$$m^2 + 6m + 9 = 13$$

$$\sqrt{(m+3)^2} = \sqrt{13}$$

$$m+3 = \pm\sqrt{13}$$

$$\quad \quad \quad -3 \quad -3$$

$m = -3 \pm \sqrt{13}$

$$-4m^2 + 10m - 71 = 4 - 5m^2$$

$$\quad \quad \quad +5m^2 \quad \quad \quad +71 \quad +71 + 5m^2$$

$$m^2 + 10m = 75$$

$$m^2 + 10m + 25 = 75 + 25$$

$$\sqrt{(m+5)^2} = \sqrt{100}$$

$$m+5 = \pm 10$$

$$\quad \quad \quad -5 \quad -5$$

$m = 5, -15$