

1) Write the equation of the line that passes through the points (2, 3) and (-4, 5).

$$-\frac{2}{6} = -\frac{1}{3}$$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = -\frac{1}{3}(x - 2) \quad y = -\frac{1}{3}x + \frac{11}{3}$$

$$y - 3 = -\frac{1}{3}x + \frac{2}{3}$$

2) Write the equation of the line perpendicular to the line in equation #1 and passes through the point (4, 5).

$$m = 3$$

$$y - 5 = 3(x - 4)$$

$$y - 5 = 3x - 12$$

$$y = 3x - 7$$

3) Solve  $\sqrt{(3x - 4)^2} = \sqrt{12}$

$$\frac{3x - 4 = \pm\sqrt{12}}{+4 \quad +4}$$

$$\frac{3x}{3} = \frac{4 \pm \sqrt{12}}{3} \quad \frac{4 \cdot 3}{2 \cdot 3}$$

$$x = \frac{4 \pm 2\sqrt{3}}{3}$$

4) What value would complete the square:  $x^2 + 8x + \frac{\quad}{\quad} = 24$

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

Quadratic Formula:

If  $ax^2 + bx + c = 0$  and  $a \neq 0$ , then

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Before we can use the quadratic formula we need to get the equation in standard form  $ax^2 + bx + c = 0$  and identify a, b, and c.

$$1) 6x^2 = -9$$

$$\boxed{ax^2 + bx + c = 0}$$

$$\boxed{6x^2 + 0x + 9 = 0}$$

$$2) 2x^2 + 8 - 9x = 0$$

$$2x^2 - 9x + 8 = 0$$

$$a = 2 \quad c = 8$$

$$b = -9$$

$$a = -3$$

$$3) 7x - 10 = 3x^2$$

$$\begin{array}{r} -3x^2 \quad -3x^2 \\ \hline -3x^2 + 7x - 10 = 0 \end{array}$$

$$b = 7$$

$$c = -10$$

1) Solve by using the quadratic equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$2x^2 + 9x + 10 = 0$$

Standard Form ✓

Identify a, b, c

$$a = 2$$

$$b = 9$$

$$c = 10$$

Substitute values

Simplify (order of operations)

$$x = \frac{-\boxed{9} \pm \sqrt{\boxed{9}^2 - 4\boxed{2}\boxed{10}}}{2 \cdot \boxed{2}}$$

$$\frac{-9 \pm \sqrt{81 - 80}}{4}$$

$$\frac{-9 \pm \sqrt{1}}{4} \Rightarrow \begin{array}{l} \frac{-9+1}{4} = -2 \\ \frac{-9-1}{4} = -\frac{10}{4} \end{array}$$

2) Solve by using the quadratic equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$2x^2 + 4x = 7$$

$-7 \quad -7$

Standard Form  $2x^2 + 4x - 7 = 0$ Identify a, b, c  
 $a = 2$   
 $b = 4$   
 $c = -7$ 

Substitute values

Simplify (order of operations)

$3 \cdot 2 \sqrt{2}$   
 $6\sqrt{2}$

$\sqrt{72}$   
 $\swarrow \searrow$   
 $9 \quad 8$   
 $\swarrow \searrow \quad \swarrow \searrow$   
 $(3 \ 3) \quad (4 \ 2)$   
 $(2 \ 2)$

$-4 \pm 6\sqrt{2}$   
 $2(-2 \pm 3\sqrt{2})$

$$\begin{aligned}
 x &= \frac{-4 \pm \sqrt{4^2 - 4(2)(-7)}}{2 \cdot 2} \\
 &= \frac{-4 \pm \sqrt{16 + 56}}{4} \\
 &= \frac{-4 \pm \sqrt{72}}{4} \\
 &= \frac{-4 \pm 6\sqrt{2}}{4} \\
 &= \frac{2(-2 \pm 3\sqrt{2})}{2 \cdot 2} \\
 &= \frac{-2 \pm 3\sqrt{2}}{2}
 \end{aligned}$$

3) Solve by using the quadratic equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = -4x^2 - 4$$

Standard Form  $4x^2 + x + 4 = 0$ Identify a, b, c  
 $a = 4$   
 $b = 1$   
 $c = 4$ 

Substitute values

Simplify (order of operations)

$$\begin{aligned}
 & \frac{-1 \pm \sqrt{1^2 - 4 \cdot 4 \cdot 4}}{2 \cdot 4} \\
 & \frac{-1 \pm \sqrt{1 - 64}}{8} \\
 & \frac{-1 \pm \sqrt{-63}}{8}
 \end{aligned}$$

4) Solve by using the quadratic equation

$$3x^2 - 5x - 2 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Standard Form ✓

Identify a, b, c

$$\begin{aligned} a &= 3 \\ b &= -5 \\ c &= -2 \end{aligned}$$

Substitute values

Simplify (order of operations)

$$\begin{aligned} & \frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(-2)}}{2(3)} \\ & \frac{5 \pm \sqrt{25 + 24}}{6} \\ & \frac{5 \pm \sqrt{49}}{6} \\ & \frac{5 \pm 7}{6} \quad \left| \begin{array}{l} \frac{12}{6} = 2 \\ \frac{-2}{6} = -\frac{1}{3} \end{array} \right. \end{aligned}$$