

$$y = 6x^2 - 23x + 7$$

$$x = \frac{23 \pm \sqrt{(-23)^2 - 4(6)(7)}}{12}$$

$$x = \frac{23 \pm \sqrt{361}}{12}$$

$$x = \frac{23 \pm 19}{12}$$

$$x = \frac{42}{12} \quad x = \frac{4}{12}$$

$$x = \frac{7}{2}$$

$$x = \frac{1}{3}$$

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

$$x = \frac{-(-4) \pm \sqrt{16 + 16}}{2}$$

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

$$-7 = 4x^2 - 3x - 1$$

$$0 = 4x^2 - 3x + 6$$

$$x = \frac{3 \pm \sqrt{(-3)^2 - 4(4)(6)}}{8}$$

$$x = \frac{3 \pm \sqrt{-87}}{8}$$

no roots!

$$x = \frac{-(-15) \pm \sqrt{(-15)^2 - 4(1)(-4)}}{2(1)}$$

$$x = \frac{-(-15) \pm \sqrt{225 + 16}}{2}$$

$$x = \frac{-(-15) \pm \sqrt{241}}{2}$$

$$x = \frac{-(-15) \pm \sqrt{144 - 4(1)(-4)}}{2(1)}$$

$$x^2 + 15x - 4 = 0$$

no roots!

no roots!

$$x = \frac{32 \pm \sqrt{1024}}{5}$$

$$x = \frac{32 \pm 32\sqrt{1024}}{5}$$

$$x = \frac{32 \pm \sqrt{(-32)^2 - 4(1)(-10)}}{2(1)}$$

$$x^2 - 32x - 10 = 0$$

Use the Quadratic Formula to solve each equation.

1. $x^2 - 4x - 96 = y$

$$\begin{array}{c} \uparrow \quad \uparrow \quad \uparrow \\ | \quad | \quad | \\ x^2 - 4x - 96 = 0 \\ \uparrow \quad \uparrow \quad \uparrow \\ a \quad b \quad c \end{array}$$

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

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-96)}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{16 + 384}}{2}$$

$$x = \frac{4 \pm \sqrt{400}}{2}$$

← discriminant
400 > 0
2 roots

$$x = \frac{4 \pm 20}{2}$$

$$\therefore x = \frac{4+20}{2}$$

$$x = \frac{4-20}{2}$$

$$x = \frac{24}{2}$$

$$x = \frac{-16}{2}$$

$$\boxed{x = 12 \quad x = -8}$$

2. $y = x^2 - 35x + 70$

$$\begin{array}{c} \uparrow \quad \uparrow \quad \uparrow \\ | \quad | \quad | \\ y = x^2 - 35x + 70 \\ \uparrow \quad \uparrow \quad \uparrow \\ a \quad b \quad c \end{array}$$

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

$$x = \frac{-(-35) \pm \sqrt{(-35)^2 - 4(1)(70)}}{2(1)}$$

$$x = \frac{35 \pm \sqrt{945}}{2}$$

$$\boxed{x = \frac{35 \pm 3\sqrt{105}}{2}}$$

$$x = \frac{35 + 3\sqrt{105}}{2}$$

$$x = \frac{35 - 3\sqrt{105}}{2}$$

$$\begin{array}{c} \sqrt{945} \\ \swarrow \quad \searrow \\ \sqrt{9} \quad \sqrt{105} \\ \textcircled{3} \quad \sqrt{5} \quad \sqrt{21} \\ \quad \quad \textcircled{\sqrt{7}} \quad \textcircled{\sqrt{3}} \\ 3 \cdot \sqrt{5} \cdot \sqrt{7} \cdot \sqrt{3} = \textcircled{3\sqrt{105}} \end{array}$$

$$x^2 - 4x - 96 = 0$$

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

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-96)}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{400}}{2}$$

$$x = \frac{4 \pm 20}{2}$$

$$x = \frac{4+20}{2} \quad x = \frac{4-20}{2}$$

$$x = \frac{24}{2} \quad x = \frac{-16}{2}$$

$$x = 12$$

$$x = -8$$

$$0 = x^2 - 35x + 70$$

$$x = \frac{35 \pm \sqrt{(-35)^2 - 4(70)}}{2}$$

$$x = \frac{35 \pm \sqrt{945}}{2}$$

$$x = \frac{35 \pm 3\sqrt{105}}{2}$$

$$x = \frac{35 + 3\sqrt{105}}{2}$$

$$x = \frac{35 - 3\sqrt{105}}{2}$$

$\sqrt{945}$

$\sqrt{105}$

$\sqrt{3}$

$$3\sqrt{105}$$

$$x^2 + 12x - 40 = y$$

$$x = \frac{-12 \pm \sqrt{12^2 - 4(-40)}}{2}$$

$$x = \frac{-12 \pm \sqrt{304}}{2}$$

$$x = \frac{-12 \pm 4\sqrt{19}}{2}$$

$$x = \frac{-12}{2} \pm \frac{4\sqrt{19}}{2}$$

$$x = -6 \pm 2\sqrt{19}$$

$\sqrt{304}$

$\sqrt{16}$

$\sqrt{19}$

$\sqrt{4}$