

**Directions:** For each problem, solve the quadratic by factoring (if possible), completing the square and by using the quadratic formula.

Quadratic Equation	Solve by Factoring	Solve by Completing the Square	Solve by using the Quadratic Formula
$x^2 - 3 = 2x$ $x^2 - 2x - 3 = 0$	$(x-3)(x+1) = 0$ $x=3 \quad x=-1$	$x^2 - 2x + 1 = 3 + 1$ $\sqrt{(x-1)^2} = \sqrt{4}$ $x-1 = \pm 2$ $x = 3 \quad x = -1$	$a=1 \quad b=-2 \quad c=-3$ $x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-3)}}{2}$ $x = \frac{2 \pm \sqrt{4+12}}{2}$ $x = \frac{2 \pm 4}{2} = \{3, -1\}$
$2x^2 = -12x - 10$ $2x^2 + 12x + 10 = 0$	$2(x^2 + 6x + 5) = 0$ $2(x+5)(x+1) = 0$ $x+5=0 \quad x+1=0$ $x=-5 \quad x=-1$	$x^2 + 6x + 9 = -5 + 9$ $\sqrt{(x+3)^2} = \sqrt{4}$ $x+3 = \pm 2$ $x = -3 \pm 2$ $x = -5 \quad x = -1$	$a=1 \quad b=6 \quad c=5$ $x = \frac{-6 \pm \sqrt{6^2 - 4(1)(5)}}{2}$ $x = \frac{-6 \pm \sqrt{16}}{2}$ $x = \frac{-6 \pm 4}{2} \quad \begin{cases} x = -5 \\ x = -1 \end{cases}$
$x^2 - 2x - 48 = 0$	$(x-8)(x+6) = 0$ $x-8=0 \quad x+6=0$ $x=8 \quad x=-6$	$x^2 - 2x + 1 = 48 + 1$ $\sqrt{(x-1)^2} = \sqrt{49}$ $x-1 = \pm 7$ $x = 1 \pm 7 \quad \begin{cases} x = 8 \\ x = -6 \end{cases}$	$a=1 \quad b=-2 \quad c=-48$ $x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-48)}}{2}$ $x = \frac{2 \pm \sqrt{4+192}}{2}$ $x = \frac{2 \pm 14}{2} \quad \begin{cases} x = 8 \\ x = -6 \end{cases}$
$2x^2 + 4x = x^2 + 2x + 63$ $x^2 + 2x - 63 = 0$	$(x+9)(x-7) = 0$ $x+9=0 \quad x-7=0$ $x=-9 \quad x=7$	$x^2 + 2x + 1 = 63 + 1$ $\sqrt{(x+1)^2} = \sqrt{64}$ $x+1 = \pm 8$ $x = -1 \pm 8 \quad \begin{cases} x = -9 \\ x = 7 \end{cases}$	$a=1 \quad b=2 \quad c=-63$ $x = \frac{-2 \pm \sqrt{4 - 4(1)(-63)}}{2}$ $x = \frac{-2 \pm \sqrt{256}}{2}$ $x = \frac{-2 \pm 16}{2} \quad \begin{cases} x = 7 \\ x = -9 \end{cases}$
$3x^2 + 36 = 4 + 20x$ $3x^2 + 20x + 32 = 0$	$3x^2 + 20x + 32 = 0$ $3x^2 - 20x + 32 = 0$ $x^2 - 20x + 96 = 0$ $(x-4)(x-8) = 0$ $(x-4)(3x-8) = 0$	$\frac{3x^2}{3} - \frac{20x}{3} + \frac{32}{3} = 0$ $x^2 - \frac{20}{3}x + \frac{32}{3} = -\frac{32}{3} + \frac{400}{36}$ $\sqrt{(x - \frac{20}{6})^2} = \sqrt{\frac{16}{36}}$ $x - \frac{20}{6} = \pm \frac{4}{6}$ $x = \frac{20}{6} \pm \frac{4}{6}$	$a=3 \quad b=-20 \quad c=32$ $x = \frac{20 \pm \sqrt{400 - 4(3)(32)}}{6}$ $x = \frac{20 \pm \sqrt{16}}{6}$ $x = \frac{20 \pm 4}{6} = \{4, \frac{8}{3}\}$

$x=4$   
 $x=8/3$

$\frac{20}{3} \pm \frac{4}{6}$   
 $\frac{40}{6} \pm \frac{4}{6}$   
 $\frac{44}{6} \quad \frac{36}{6}$   
 $\frac{44}{6} \quad \frac{36}{6}$

$x = \frac{20}{6} \pm \frac{4}{6}$   
 $x = 4 \quad x = \frac{8}{3}$