

Chapter 5 Solving Quadratics

<p>Solve by Factoring: Only works when the quadratic is factorable:</p> <ol style="list-style-type: none"> 1. Set equal to 0 2. Factor the quadratic 3. Set each factor equal to 0 and solve for x 	<p>Example 1: Solve $x^2 - 3 = 2x$</p> $x^2 - 3 = 2x$ $x^2 - 2x - 3 = 0$ $(x - 3)(x + 1) = 0$ $x - 3 = 0 \text{ or } x + 1 = 0$ $x = 3 \text{ or } x = -1$ <p>Then the solution to $x^2 - 3 = 2x$ is $x = -1, 3$</p>	<p>Example 2: Solve $x^2 - 7x = 0$</p> $x^2 - 7x = 0$ $x(x - 7) = 0$ $x = 0 \text{ or } x - 7 = 0$ $x = 0 \text{ or } x = 7$ <p>The solution is $x = 0, 7$</p>
<p>Solve by Square Rooting: Only works when the quadratic does not have an "x" term</p>	<p>Example 1: Solve $(x - 5)^2 - 100 = 0$</p> $(x - 5)^2 - 100 = 0$ $(x - 5)^2 = 100$ $\sqrt{(x - 5)^2} = \pm\sqrt{100}$ $x - 5 = \pm 10$ $x = 5 \pm 10$ $x = 5 - 10 \text{ or } x = 5 + 10$ $x = -5 \text{ or } x = 15$ <p>The solution is $x = -5$ or $x = 15$</p>	<p>Example 2: Solve $x^2 - 48 = 0$</p> $\sqrt{x^2} = \pm\sqrt{48}$ $x = \pm\sqrt{3 \cdot 16}$ $= \pm 4\sqrt{3}$ <p>The solution is $x = \pm 4\sqrt{3}$</p>
<p>Solve by Quadratic Formula: Works on every quadratic when done correctly</p> <ol style="list-style-type: none"> 1. set equal to 0 2. plug in a, b, and c 3. simplify <p>When $ax^2 + bx + c = 0$</p> $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	<p>Example 1: Solve $6x^2 - 35 = -11x$</p> $6x^2 + 11x - 35 = 0$ $a = 6, b = 11, c = -35$ $x = \frac{-11 \pm \sqrt{(11)^2 - 4(6)(-35)}}{2(6)}$ $= \frac{-11 \pm \sqrt{121 + 840}}{12}$ $= \frac{-11 \pm \sqrt{961}}{12} = \frac{-11 \pm 31}{12}$ $= \frac{-11 - 31}{12}, \frac{-11 + 31}{12}$ $= -\frac{42}{12}, \frac{20}{12} = -\frac{7}{2}, \frac{5}{3}$ <p>The solution is $x = -7/2, 5/3$</p>	<p>Example 2: Solve $x^2 - 4x - 8 = 0$</p> $a = 1, b = -4, c = -8$ $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-8)}}{2(1)}$ $= \frac{4 \pm \sqrt{16 + 32}}{2} = \frac{4 \pm \sqrt{48}}{2}$ $= \frac{4 \pm \sqrt{3 \cdot 16}}{2} = \frac{4 \pm 4\sqrt{3}}{2}$ $= \frac{2(2 \pm 2\sqrt{3})}{2} = 2 \pm 2\sqrt{3}$ <p>Then the solution is $x = 2 \pm 2\sqrt{3}$</p>

Solve each quadratic using any of the 3 methods.

1. $x^2 + 6x + 9 = 0$

2. $x^2 - 15x + 56 = 0$

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

$x = -3$ mult of 2

$x = \frac{2}{3}$ $x = 1$

4. $25x^2 = 16$

5. $4x^2 + 11x = 3x - 10$

6. $x^2 = 3x$

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

7. $\frac{1}{4}(x+1)^2 - 16 = 0$

8. $3x^2 + 2x + 1 = 0$

9. $6x^2 + 2x = 0$

$$x = 7 \quad x = -9$$

10. $x^2 - 4x + 1 = 0$

11. $x^2 = 3x + 2$

12. $x^2 - 324 = 0$

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

$$x = \pm 18$$

13. $x^2 + 6x - 4 = 0$

14. $3(x-1)^2 = 9$

15. $5x^2 + x = 3$

$$x = \frac{-1 \pm \sqrt{61}}{10}$$