

# **Algebra II**

## 7-2

### Quadratic Formula

Solve for x.

$$ax^2 + bx + c = 0$$

$$(ax^2 + bx) + c = 0$$
$$a\left(x^2 + \frac{b}{a}x + \frac{b^2}{4a^2}\right) + c - \frac{b^2}{4a} = 0$$

$$\frac{b}{a}, \frac{1}{2} \cdot \frac{b}{a} = \frac{b}{2a}, \frac{b^2}{4a^2}$$

$$a\left(x + \frac{b}{2a}\right)^2 = \frac{b^2}{4a} - \frac{4ac}{4a}$$

$$\frac{1}{a} \cdot a\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a} \cdot \frac{1}{a}$$

$$\sqrt{\left(x + \frac{b}{2a}\right)^2} = \sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$\left|x + \frac{b}{2a}\right| = \frac{\sqrt{b^2 - 4ac}}{2a}$$

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

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

Quadratic  
Formula

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

## Quadratic Formula -

If a quadratic equation is in the *general form* of  $ax^2 + bx + c = 0$ , it can always be solved using the quadratic formula:

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

List the three techniques you may use to solve a quadratic equation:

- 1) Factoring
- 2) Radical method, includes completing the square.
- 3) Quadratic Formula

Solve each equation. (pg 313)

$$1) x^2 + 6x + 4 = 0$$

$$a=1 \quad b=6 \quad c=4$$

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

$$x = \frac{-(6) \pm \sqrt{6^2 - 4(1)(4)}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{36 - 16}}{2} = \frac{-6 \pm \sqrt{20}}{2}$$

$$\frac{-6 \pm 2\sqrt{5}}{2} = \{-3 \pm \sqrt{5}\}$$

$$13) (3n - 5)(2n - 2) = 6$$

$$6n^2 - 6n - 10n + 10 = 6$$

$$6n^2 - 16n + 10 = 6$$

$$\frac{6n^2}{2} - \frac{16n}{2} + \frac{4}{2} = \frac{0}{2}$$

$$3n^2 - 8n + 2 = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(3)(2)}}{2(3)}$$

$$\frac{8 \pm \sqrt{64 - 24}}{6} = \frac{8 \pm \sqrt{40}}{6} = \frac{8 \pm 2\sqrt{10}}{6} \left\{ \frac{4 \pm \sqrt{10}}{3} \right\}$$

$$15) \left( \frac{w^2}{2} - w = \frac{3}{4} \right) \cdot 4$$

$$2w^2 - 4w = 3$$

$$2w^2 - 4w - 3 = 0$$

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

$$\frac{4 \pm \sqrt{16 + 24}}{4} = \frac{4 \pm \sqrt{40}}{4}$$

$$\frac{4 \pm 2\sqrt{10}}{4} = \left\{ \frac{2 \pm \sqrt{10}}{2} \right\}$$

$$29) x^2 - x\sqrt{2} - 1 = 0$$

$$a=1 \quad b=-\sqrt{2} \quad c=-1$$

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

$$\frac{\sqrt{2} \pm \sqrt{2+4}}{2} = \left\{ \frac{\sqrt{2} \pm \sqrt{6}}{2} \right\}$$

Solve. Round answers to the nearest hundredth.

$$19) \frac{2n^2}{2} - \frac{4n}{2} = \frac{8}{2}$$

$$n^2 - 2n = 4$$

$$n^2 - 2n - 4 = 0$$

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

$$\frac{2 \pm \sqrt{4+16}}{2} = \frac{2 \pm \sqrt{20}}{2}$$

$$\frac{2 \pm 2\sqrt{5}}{2} = \{1 \pm \sqrt{5}\} \{3.23, -1.23\}$$

Pg 313  
2-4 Even