

LESSON #3: USING THE QUADRATIC FORMULA (DAY 2)

Now: Simplify: $\frac{-4 + \sqrt{8}}{2}$

$$\frac{\sqrt{8}}{2} = \frac{\sqrt{4 \cdot 2}}{2} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$\frac{-4 + \sqrt{8}}{2} = \frac{-4 + 2\sqrt{2}}{2} = -2 + \sqrt{2}$$

1. Consider the following polynomial equation.

$$(x^2 - 4x + 3)(x^2 + 4x - 5) = 0$$

a. What is the degree of this polynomial? How do you know?

4 - when you mult it out $x^2 \cdot x^2 = x^4$

b. How many solutions to this equation should there be?

4

c. Let's solve this equation.

$$\begin{array}{c} a \quad m \quad a \quad m \\ (x^2 - 4x + 3)(x^2 + 4x - 5) = 0 \\ (x-3)(x-1)(x+5)(x-1) \\ \hline 3 \quad | \quad 1 \quad | \quad -5 \quad | \quad 1 \end{array}$$

$\{-5, 1 \text{ mult } 2, 3\}$

2. Find the x-intercepts in simplest radical form.

↳ QUAD. FORMULA

$$(x^2 - 6x + 9)(2x^2 - 4x - 7) = 0$$

$$(x-3)(x-3) \quad x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(-7)}}{2(2)}$$

$$\frac{\sqrt{72}}{2} = \frac{\sqrt{36 \cdot 2}}{2} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$$

$$x = \frac{4 \pm \sqrt{72}}{4}$$

$$x = \frac{4 \pm 6\sqrt{2}}{4}$$

$\{3 \text{ mult } 2, \frac{2 \pm 3\sqrt{2}}{2}\}$

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

Quadratic Formula (On reference sheet) $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

3. Find all real solutions to $x^3 - 8x^2 - 2x + 16 = 0$.

$$x^2(x-8) - 2(x-8) = 0$$

$$(x^2 - 2)(x - 8)$$

$$x^2 - 2 = 0 \quad | \quad x - 8 = 0$$

$$x = \pm\sqrt{2} \quad | \quad x = 8$$

$$\{ \pm\sqrt{2}, 8 \}$$

Practice:

4. Find the roots to the nearest tenth. $x^2 + 4x + 2 = 0$
 in simplest radical form

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

$$x = \frac{-4 \pm \sqrt{8}}{2}$$

$$x = \frac{-4 + \sqrt{8}}{2} = -.6$$

$$x = \frac{-4 - \sqrt{8}}{2} = -3.4$$

$$\{ -3.4, -.6 \}$$

5. Find all real solutions to the equation

form.

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

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(3)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{24}}{2} = \frac{\sqrt{4}}{\sqrt{6}} = 2\sqrt{6}$$

$$x = 3 \pm \sqrt{6}$$

$$x = 3 \pm \sqrt{6}$$

$$\{ 3 \pm \sqrt{6} \}$$

LAB #5

1. Find all zeroes: $(x^2 - 6x - 7)(x^2 - 6x + 4) = 0$

$$\begin{array}{r|l} (x-7)(x+1) & \\ \hline 7 & -1 \end{array} \quad x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(4)}}{2(1)}$$

Quadratic Formula:

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

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

$$x = 5.2, .8$$

$\{-1, .8, 5.2, 7\}$

2. Find all real solutions to the equation to the nearest hundredth and in simplest radical form.

$$\begin{aligned} x^2 - 7x &= 7x + 8 \\ -7x - 7x - 8 & \end{aligned}$$

$$x^2 - 14x - 8 = 0$$

$$x = \frac{-(-14) \pm \sqrt{(-14)^2 - 4(1)(-8)}}{2(1)}$$

$$x = -7 \pm \sqrt{57}$$

 or

$$.5, -14.5$$

$$x = \frac{-14 \pm \sqrt{228}}{2} < \begin{matrix} \sqrt{4} \\ \sqrt{57} \end{matrix}$$

$$x = \frac{-14 \pm 2\sqrt{57}}{2}$$

Factor the following completely:

3. $4x^2 - 9$

$$(2x+3)(2x-3)$$

4. $x^3 + 3x^2 - 4x - 12$

$$x^2(x+3) - 4(x+3)$$

$$(x^2 - 4)(x+3)$$

$$(x+2)(x-2)(x+3)$$

5. $6x^2 + x - 12$

$$6x^2 - 8x + 9x - 12$$

$$2x(3x-4) + 3(3x-4)$$

$$(2x+3)(3x-4)$$

