Quadratic Formula:
$$x = \frac{-b \pm \sqrt{b^2 - 4(a)(c)}}{2a}$$
Polynomial Equations Day 3 Notes

Notable Student: ey

Date:

Solve
$$3x^2 + 4x + 4 = 0$$
.

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

$$X = \frac{-4 \pm \sqrt{4^2 - 4(3)(4)}}{2(3)} = \frac{-4 \pm \sqrt{16 - 48}}{6} = \frac{-4 \pm \sqrt{-32}}{6}$$

2 problems: we need to know what it means when we take the square root of a negative number and we need to know how to simplify square roots.

Simplifying Square Roots: Look at the table below and try to fill it out using your calculators to find the decimal approximations.

Radical Expression	Decimal Approximation	Radical Expression	Decimal Approximation
$\sqrt{40}$		$\sqrt{4} \cdot \sqrt{10}$	
$\sqrt{90}$		$\sqrt{9} \cdot \sqrt{10}$	
$\sqrt{98}$		$\sqrt{49} \cdot \sqrt{2}$	
$\sqrt{125}$		$\sqrt{25} \cdot \sqrt{5}$	

What do we notice? What does that tell us about square roots?

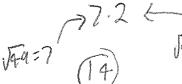
Our best friends (perfect squares): 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Practice: Simplify the following:

1.
$$\sqrt{128}$$

2.
$$\sqrt{150}$$

4.
$$\sqrt{97}$$



Non-real calculation (i) error
Carl Friedrich Gauss discovered a new set of numbers, the <u>complex numbers</u> when trying to figure out the answer to $\sqrt{-1}$. Today we define this as "i" and we say $\sqrt{-1} = \frac{n}{L}$

We can use this to simplify these radicals:

1.
$$\sqrt{-36}$$

Going back to our original problem: Solve $3x^2 + 4x + 4 = 0$.

$$2. \sqrt{-96}$$

3.
$$\sqrt{-245}$$

Practice: Solve the following:

1.
$$5x^2 - 2x + 5 = 0$$

2.
$$x^2 - 6x + 12 = 0$$

$$3. 9x^2 - 4x + 2 = 0$$