Warm-up:

Use the calculator to find the zeros (Round to hundreths place)

1) $3x^2 + 5x - 10 = 0$

2) $x^2 - 6x = -9$

3) $x^2 + 3 = 0$

Oct 11-4:23 PM

Warm-up: Simplify each.

1) $\sqrt{20} = 2\sqrt{5}$

2) $-5\sqrt{72}$

$-5(2)\sqrt{18}$

$= -10\sqrt{18}$

3) $\sqrt{588}$ X

4) $\sqrt{49} = 7$

5) $-\sqrt{49} = -7$

6) $\sqrt{-49}$

$= \sqrt{-1}\sqrt{49}$

$(*7$

$= 7i$

Aug 8-9:20 AM

Solving Quadratic Equations

$ax^2 + bx + c = 0$

Methods

1) Completing the Square
2) Quadratic Formula
3) Factoring
4) Taking Square roots
5) Finding zeros in calculator

Sep 24-8:11 PM

All quadratic equations can be solved, but not all quadratic equations have real solutions. What does that mean???

Sep 24-8:17 PM

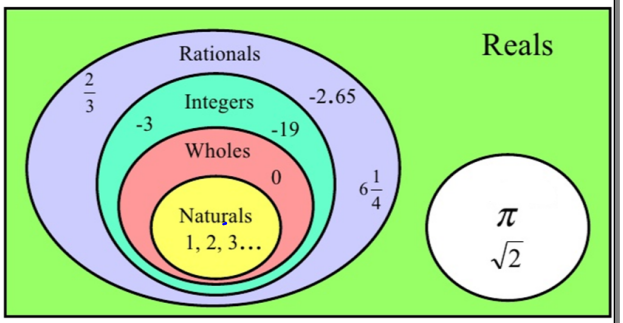
In order to solve all quadratic equations, we will need to step into the **Complex Number System**

....First, let's see if we remember what makes up the Real Number System

Sep 18-9:05 PM

Choose from: Wholes, Naturals, Rationals, Irrationals, Reals, Integers

Real Number System



Jan 19-4:12 PM

Remember $\sqrt{-1}$ in real number system?

It was undefined

Now...into the complex number system.

$\sqrt{-1}$: No longer undefined...it gets a name!

$i = \sqrt{-1}$ $i^2 = -1$

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

Feb 25-3:58 PM

and it's name is...

$$i = \sqrt{-1}$$

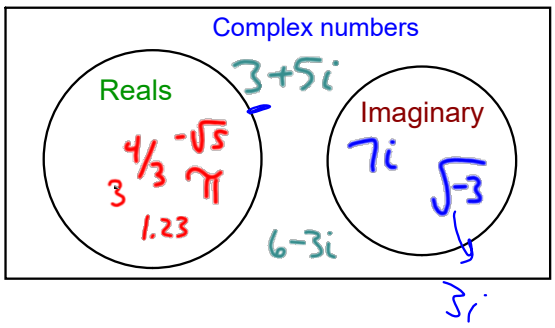
Complex number: Form a + bi

real part

imaginary part

Feb 25-4:00 PM

Complex Number System



Feb 25-4:00 PM

A) Simplify

$\sqrt{a \cdot b} = \sqrt{a}\sqrt{b}$

1) $\sqrt{-25} = \sqrt{-1(25)} = \sqrt{-1}\sqrt{25} = 5i$

2) $10\sqrt{-72} = 10\sqrt{-1(72)} = 10\sqrt{-1}\sqrt{4}\sqrt{18}$

$= 20i\sqrt{18}$

3) $\frac{2+\sqrt{-75}}{2+5i\sqrt{3}}$

4) $-5\sqrt{-18}$

$= -5\sqrt{-1(9)(2)}$

$= -5(3)i\sqrt{2} = -15i\sqrt{2}$

Feb 25-4:08 PM

Solving Quadratics by **Completing the Square**

If and only if $a = 1$

$ax^2 + bx + c = 0$

$= 1$

Sep 18-9:08 PM

First, we need to know what a perfect square trinomial is and how to create one

Sep 24-8:21 PM

What is a "perfect square trinomial" ??

$x^2 - 16x + 64$

$a^2 - 2ab + b^2 = (a-b)^2$

$\sqrt{x^2} = x = a$

$\sqrt{64} = 8 = b$

$2ab = 16x$

$= (x-8)^2$

Sep 24-8:25 PM

Now...Make a perfect square trinomial

ax^2+bx+c

1) $x^2 + 10x + \_\_25\_\_$

$a^2+2ab+b^2$ $a=x$

$(x+5)^2$ $b=5$

2) $x^2 - 16x + \_\_64\_\_$

$a^2-2ab+b^2$

$(a-b)^2$

3) $x^2 - 5x + \_\frac{25}{4}\_$

$\square = (\frac{b}{2})^2$

$(\frac{10}{2})^2$

25

$(\frac{5}{2})^2 = \frac{25}{4}$

$a=x$ $b=8$

$(x-8)^2$

$(x-\frac{5}{2})^2$

Oct 1-8:35 AM

Solve by completing the square

1) $x^2 - 6x - 40 = 0$

$a=1$ ✓

$x^2 - 6x = 40$ $\square = (\frac{b}{2})^2$

$x^2 - 6x + 9 = 40 + 9$ $\square = (\frac{-6}{2})^2$

$x^2 - 6x + 9 = 49$ $\square = 9$

$\sqrt{x^2} = x = a$, $\sqrt{9} = 3 = b$

$a^2 - 2ab + b^2 = (a-b)^2$

$(x-3)^2 = 49$

$\sqrt{(x-3)^2} = \sqrt{49}$

$x - 3 = \pm 7$

$x-3=7$ | $x-3=-7$

$x=10$ | $x=-4$

Oct 2-9:05 AM

2) $x^2 + 12x + 4 = 0$

$x^2 + 12x = -4$

$x^2 + 12x + 36 = -4 + 36$

$a^2 + 2ab + b^2 = (a+b)^2$

$a=x$, $b=6$

$\square = (\frac{b}{2})^2$

$\square = (\frac{12}{2})^2 = 36$

$(x+6)^2 = 32$

$\sqrt{(x+6)^2} = \sqrt{32}$ $x+6 = 4\sqrt{2}$

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

$x = 4\sqrt{2} - 6$

or $x+6 = -4\sqrt{2}$

$x = -4\sqrt{2} - 6$

Oct 2-9:10 AM

3) $x^2 + 12x + 7 = 6$

Now try to do it by yourself !

Oct 2-9:13 AM

4) $2x^2 - 20x + 10 = 0$

More practice

Sep 18-8:57 PM

5) $x^2 + 2x + 3 = -5$

Oct 2-12:50 PM

6) $x^2 + 8x + 31 = 6$

Mar 5-4:57 PM

7) $2x^2 - 12x + 6 = 0$

Sep 24-8:31 PM