Check Up Time...

1. Solve each of the following:

(a)
$$3x^2 + 8 = 10x$$

(b)
$$x^2 - 5x > 14$$

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 (c) $x^3 + 3x^2 - 24x = 26$

2. Simplify each of the following:

$$(a) \left(2 - 3\sqrt{8}\right)^2$$

$$(b)\frac{2\sqrt{3}}{3-\sqrt{8}}$$

3. Evaluate the following:

$$27^{-\frac{2}{3}} + 3w^{0} - \frac{2}{3^{-2}} - 3^{-2} + \frac{2}{5^{-2}}$$

Complex Numbers

Look at the following equation...

$$x + 1 = 0$$
 , $x \in W$ ---- No Solution over the whole numbers

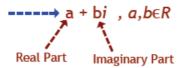
If we extend to the integers or real number systems then there will be a solution.

What about the equation $x^2 + 1 = 0$, $x \in \mathbb{R}$?

$$x^2 = -1$$

$$x = \sqrt{-1}$$
 ???

There is no solution over the real number system, therefore we extend into a new number system...the Complex Numbers.



So what about this "i" that appears?

$$i^2 = -1$$

Most Important prinicple in complex number system

What is $\sqrt{-36}$?

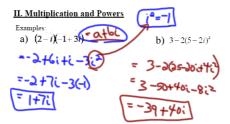
Basic Operations involving Complex Numbers

LAddition and Subtraction
$$(a+bi)+(c+di)=(a+c)+(b+d)i$$
Collect 'real' terms
$$Collect 'imaginary' terms$$

Example:

Express the following complex expression in standard form:

$$2(3-5i)-(7-5i)+2(-1+i)$$



c)
$$2i^{5} - i^{8} + (2i^{3})_{5}^{5}$$

$$= 2i^{5} - i^{8} + 32i^{16}$$

$$= 2i^{5} - i^{8} + 32i^{16}$$

$$= (i^{3})_{1}^{5} - (i^{3})_{1}^{5} + 53i^{1}_{1}^{5}$$

$$= (i^{3})_{1}^{6}$$

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$$= (i^{3})_{1}^{6}$$

III. Division

Before we can divide we must first review the concept of conjugates...

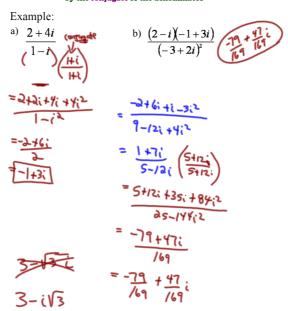
$$a+bi \Leftrightarrow a-bi$$

Examine what happens when you multiply complex conjugates

$$(2-5i)(2+5i)$$

Now we are ready to try division...

Multiply the numerator and denominator by the conjugate of the denominator



Principle of Equality - "Comparison"

- comparison of left side versus right side.
- real parts must equal eachother and the imaginary parts must be equal.

