Complex Numbers

Questions to consider:

1. What is the complex number system?
2. What is the number $i$, and what does it represent?
3. How can we use $i$ to help us solve quadratic equations?

We have already solved quadratic equations by taking the square root of both sides of the equation.

Here is an example: $x^2 = 16$

What if we saw something like this: $x^2 = -16$

What's wrong?

We have a solution to this problem: _____

By definition, $i =$ _____ then $i^2 =$ _____

Some examples – we want to break this into something we already know how to do, so get rid of the negative first (by using $i$):

a.) $\sqrt{-16}$

b.) $\sqrt{-20}$

c.) $\sqrt{-25}$

d.) $\sqrt{-50}$

Let's use this to help us solve some equations – remember our ultimate goal is to get $stuff^2 = number$

a.) $x^2 + 10 = -26$

b.) $2x^2 + 12 = -20$

c.) $3x^2 - 10 = -46$

d.) $2x^2 + 26 = -10$

e.) $-2(x + 4)^2 = 16$

f.) $3(x - 2)^2 + 20 = -1$

The complex number system: believe it or not, every number you have dealt with is a complex number.

General form of a complex number: $a + bi$ a? b?

How can we write **3** in complex number form?

Complex Numbers $(a + bi)$

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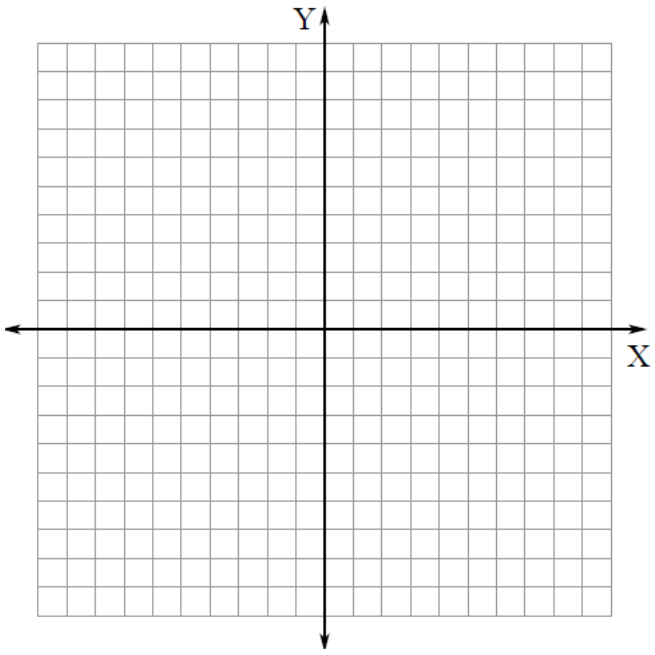
Just like we can plot the points (2, 5) and (-3, 6), we can plot a complex number on the _____. Label the axes.

a.) $2 - 3i$ b.) $-3 + 2i$ c.) $4i$




We can also add and subtract complex numbers. Even though it is not, treat $i$ like it is a _____. First order of business is to attack the _____.

a.) $(4 - i) + (3 + 2i)$ b.) $(7 - 5i) - (1 - 5i)$

c.) $6 - (-2 + 9i) + (-8 + 4i)$ d.) $5 + (-3 - 2i) - (3 + i)$