

Do Now

Solve for x , by using the quadratic formula

$$-4x^2 - 4x - 6 = 0$$


We are used to being told, "we can't take the square root of a negative number." Until Now...

You will now be introduced to

Imaginary Numbers.

So-called "**imaginary numbers**" are as normal as every other number: they're a tool to describe the world. In the same spirit of assuming -1 , $.3$, and 0 "exist", let's assume some number i exists where:

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

 imaginary number bridge (play until 3:45)

Complicated?

Complex **does not** mean complicated.



It means the two types of numbers, real and imaginary, together form a **complex**, just like you might have a building complex (buildings joined together).

A Combination

So we have this definition:

A Complex Number is a combination of a Real Number and an Imaginary Number

$$a + bi$$

Real Part \rightarrow a Imaginary Part \rightarrow b $i = \sqrt{-1}$

Examples:

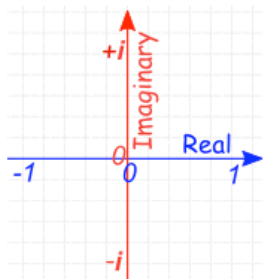
$1 + i$

$39 + 3i$

$0.8 - 2.2i$

$-2 + \pi i$

$\sqrt{2} + i/2$



Complex Plane

You can also put complex numbers on a [Complex Plane](#).

- The Real part goes left-right
- The Imaginary part goes up-down

Either Part Can Be Zero

So, a Complex Number has a real part and an imaginary part.

But either part can be **0**, so all Real Numbers and Imaginary Numbers are also Complex Numbers.

Complex Number	Real Part	Imaginary Part
$3 + 2i$	3	2
5	5	0
$-6i$	0	-6



Funny Complex Number Video