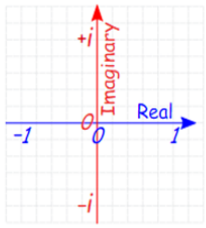
Absolute Value & Direction of Complex #s p. 74

Complex Plane

No, **not** that complex plane ...

... **this** complex plane:

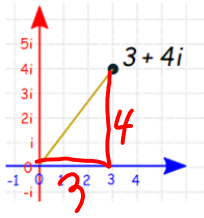


A **plane** for **complex** numbers!

This is a vector.
It has magnitude (length) and direction.

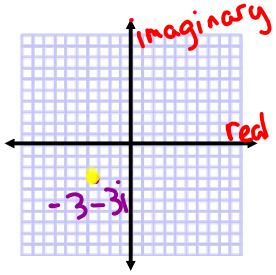
And here is the complex number **3 + 4i**

as a Vector: (3,4) ⟨3,4⟩

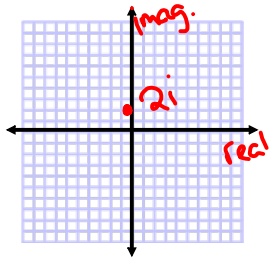


Plot in the complex plane

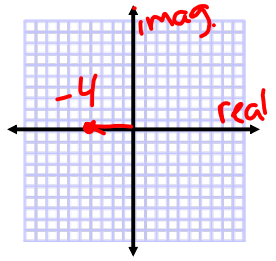
1. -3 - 3i
real imag.
like (-3,-3)



2. 2i
0 + 2i
(0,2)



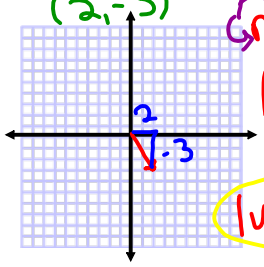
3. -4
-4+0i
(-4,0)



Absolute Value & Direction of Complex #s

Absolute value is the distance from a # to 0 or from the point to the origin, so it is the same as the magnitude of the vector.

1. 2 - 3i
(2,-3)



Absolute Value
(magnitude)

$|v| = \sqrt{a^2+b^2}$

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

$|v| = \sqrt{13} \approx 3.6$

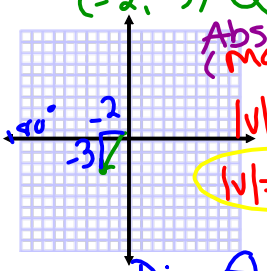
direction: $\theta = \tan^{-1}\left(\frac{b}{a}\right)$

$\theta = \tan^{-1}\left(\frac{-3}{2}\right)$

$\theta = -56.3° + 360°$

$\theta = 303.7°$

2. -2 - 3i
(-2,-3) Q III



Abs. Value (magnitude):

$|v| = \sqrt{(-2)^2+(-3)^2}$

$|v| = \sqrt{13} \approx 3.6$

Dir: $\theta = \tan^{-1}\left(\frac{-3}{-2}\right)$

$\theta = 56.3°$

$+180$

$\theta = 236.3°$