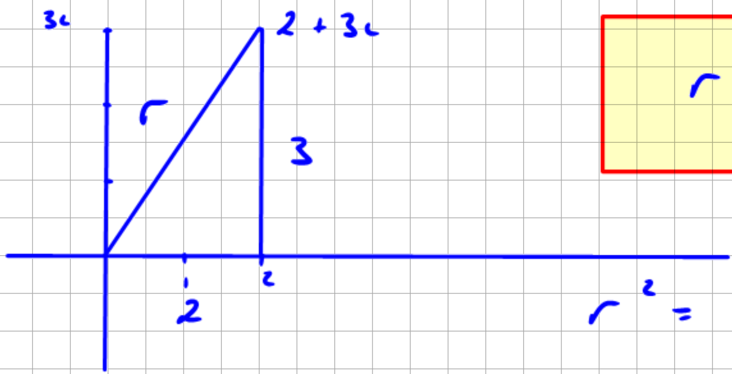
Modulus.

Plot $z = 2+3i$ on Argand diagram.

Find $|z|$

$|z|$ = modulus. = distance to origin.



$$\boxed{r = |z|}$$

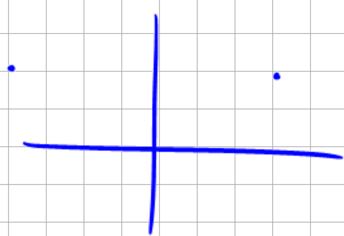
$$r^2 = 2^2 + 3^2$$
$$r = \sqrt{13}$$

$w = -3-2i$ find $|w|$

$$z = x + yi$$
$$|z| = \sqrt{x^2+y^2}$$
$$= \sqrt{(-3)^2+(-2)^2} = \sqrt{9+4} = \sqrt{13}$$

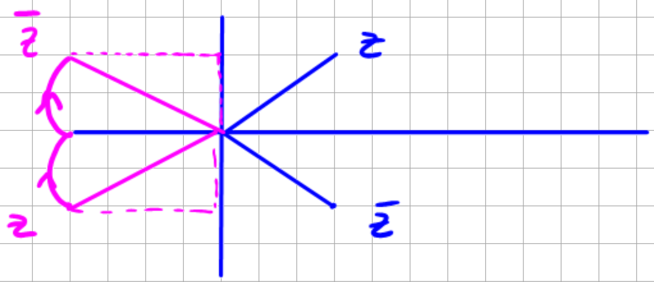
$z = k+8i$ given $|z| = 10$ find 2 values for k.

$$z = x + yi$$
$$|z| = \sqrt{x^2+y^2}$$
$$\sqrt{k^2+8^2} = 10$$
$$k^2+64 = 100$$
$$k^2 = 36$$
$$k = \pm 6$$



Prove $|z| = |\bar{z}|$.

Let
$$z = x + yi$$
$$\bar{z} = x - yi$$
$$|z| = \sqrt{x^2 + y^2}$$
$$|\bar{z}| = \sqrt{x^2 + (-y)^2} = \sqrt{x^2 + y^2} = |z|.$$



Solve $\sqrt{3}\,|w| + iw = 2 + \sqrt{2}i$ find w in rectangular form.

$$w = x + yi$$
$$|w| = \sqrt{x^2 + y^2}$$
$$iw = xi + yi^2 = -y + xi$$

$$iw = i(x + yi) = xi + yi^2 = xi + y(-1) \quad -y + xi$$

$$\sqrt{3}\,|w| + iw = 2 + \sqrt{2}i$$
$$\underbrace{\sqrt{3}\sqrt{x^2 + y^2}}_{R} \underbrace{-y}_{R} \underbrace{+ xi}_{I} = \underbrace{2}_{R} + \underbrace{\sqrt{2}i}_{I}$$

Img = Img
Real = Real.

$$x = \sqrt{2}$$

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

$$\sqrt{3}\sqrt{x^2 + y^2} - y = 2$$
$$\sqrt{3}\sqrt{2 + y^2} = y + 2$$
$$\sqrt{6 + 3y^2} = y + 2$$
$$6 + 3y^2 = y^2 + 4y + 4$$
$$2y^2 - 4y + 2 = 0$$
$$y^2 - 2y + 1 = 0$$
$$(y-1)^2 = 0$$
$$y = 1$$
$$w = \sqrt{2} + i$$