Complex numbers in

polar coordinate system

$2+3i = z$

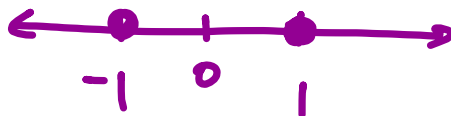position vector.

$2+3i$

Plot z.

$|2+3i| = \sqrt{2^2+3^2}$

$= \sqrt{13}$

i

R

2

$|x| = 1$

-1   0   1

$|z| = 1$

* $z = a+bi$

i

R

-1   1

-1

$|v| = 1$

z

sphere

* $v = a_1 i + a_2 j + a_3 k$

1

y

1

x
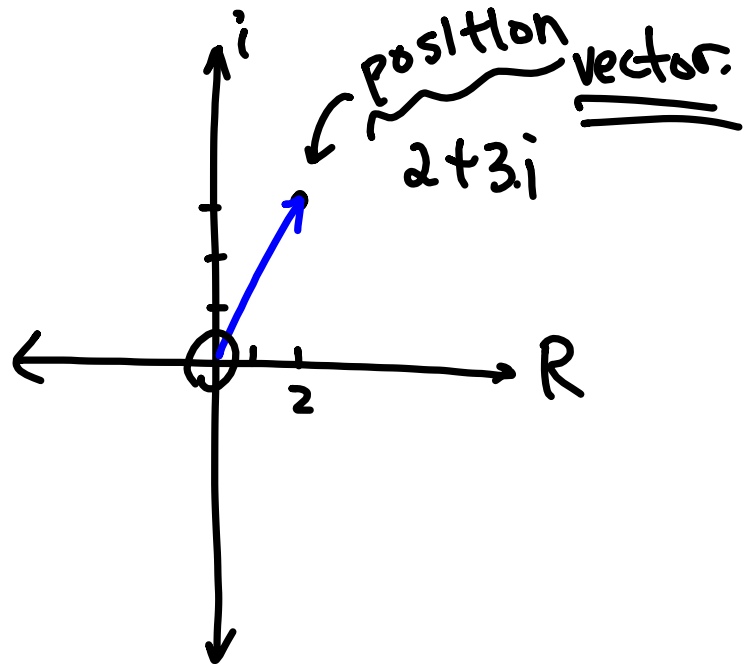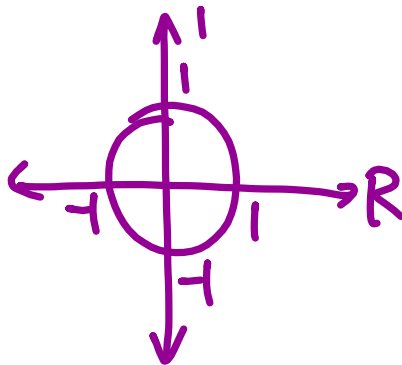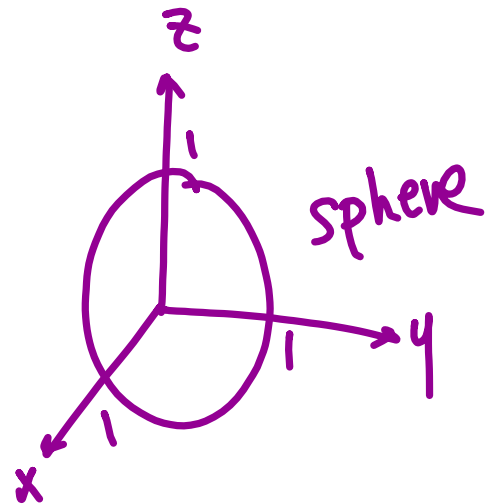
Let $z = 6 - 2i$

$* \bar{z} = 6 + 2i$
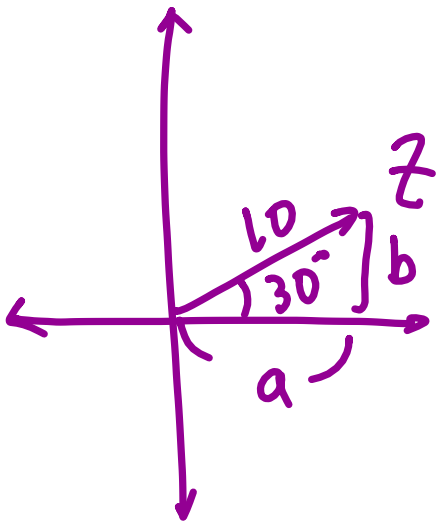
$z \cdot \bar{z} = |z|^2$

Find. $|z| = \sqrt{40}$

$= \sqrt{6^2 + 2^2}$

$= \sqrt{(6+2i)(6-2i)}$

$= \sqrt{z \cdot \bar{z}}$

Find (a, b) where $Z = a + bi$.

$$a = 5\sqrt{3} = 10 \cos 30°$$
$$b = 5 = 10 \sin 30°$$

$a + bi$

$a = r\cos\theta$

$b = r\sin\theta$

$a + bi = r\cos\theta + (r\sin\theta)i$

$= r\operatorname{cis}\theta$