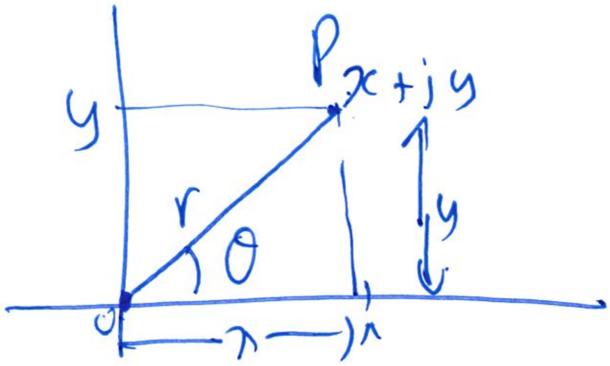


$$x + jy = r\cos(\theta) + j\, r\sin(\theta)$$

$$= r\left[\cos(\theta) + j\sin(\theta)\right] = r\angle\theta$$

where $r = \sqrt{x^2 + y^2}$, $\theta = \tan^{-1}\left(\frac{y}{x}\right)$

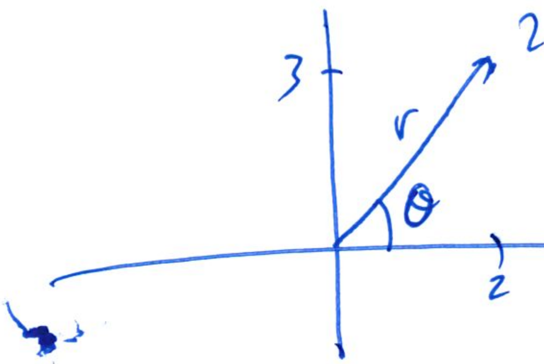
r is called the modulus of $z = x + jy$

θ is called the argument of $z = x + jy$.

$-180^\circ \le \theta \le +180^\circ$ —— principal argument.

Express $2 + j3$ in polar form.

<u>Soln</u>,



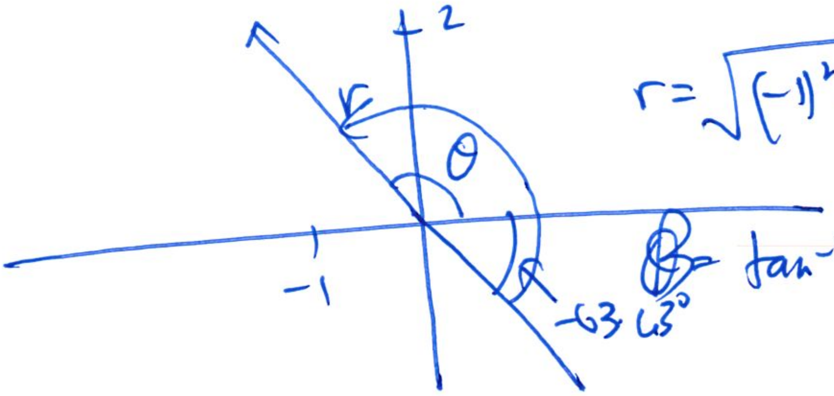
$$r = \sqrt{2^2 + 3^2} = \sqrt{13}$$

$$\theta = \tan^{-1}\left(\frac{3}{2}\right) = 56.31^\circ$$

$$2 + j3 = \sqrt{13}\angle 56.31^\circ$$

$-1+j2$ into polar form.

Soln:



$$r=\sqrt{(-1)^2+2^2}=\sqrt{5}$$

$$\tan^{-1}\left(\frac{2}{-1}\right)=-63.43^\circ$$

$$\theta = 180^\circ - 63.43^\circ$$
$$=116.57^\circ$$

$$-1+j2=\sqrt{5}\,\angle 116.57^\circ$$

$$2 = 2+j0 = 2\angle 0^\circ$$

$$j2 = 2\angle 90^\circ$$

$$-2 = 2\angle 180^\circ$$

$$-j2 = 2\angle 270^\circ \text{ or } 2\angle -90^\circ$$

Express $2\angle 53^\circ$ into $x+jy$ form.

$$\boxed{r\angle\theta = r\cos(\theta)+jr\sin(\theta)}$$

$2\angle$

$$2\angle 53^\circ = 2\cos(53^\circ) + j\,2 \times \sin(53^\circ)$$
$$= 1.2 + j\,1.6$$

$\div$

$$\frac{3-j4}{2} = \frac{3}{2} - j\frac{4}{2} = 1.5 - j2$$

$$\frac{5-j3}{3+j4} = \frac{(5-j3)(3-j4)}{(3+j4)(3-j4)}$$

$$= \frac{15 - j20 - j9 + j^2 12}{3^2+4^2}$$

$$= \frac{15 - j29 - 12}{25}$$

$$= \frac{3 - j29}{25} = \frac{3}{25} - j\frac{29}{25}$$

Let $Z = 100 - j25$. find $\frac{1}{Z}$

Soln:

$$\frac{1}{Z} = \frac{1}{100 - j25}$$

$$= \frac{1}{25} \cdot \left(\frac{1}{4-j}\right)$$

$$= \frac{1}{25}\left(\frac{4+j}{17}\right) = \frac{1}{25 \times 17}(4+$$