

Examples

1. Find the modulus and the argument of each of the following complex numbers

a) $6 - 5i$

c) $-3 + 4i$

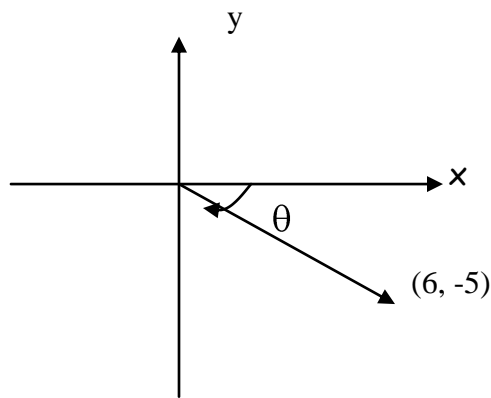
b) $2i$

d) $i + 2$

Solution

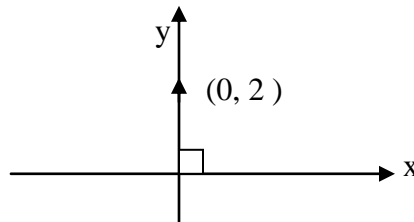
1 a) $|Z| = \sqrt{x^2 + y^2}$
 $= \sqrt{6^2 + (-5)^2}$
 $= \sqrt{36 + 25}$
 $= 11$

$$\theta = \tan^{-1}\left(\frac{y}{x}\right)$$
$$= \tan^{-1}\left(\frac{-5}{6}\right)$$
$$= -39.81^\circ$$



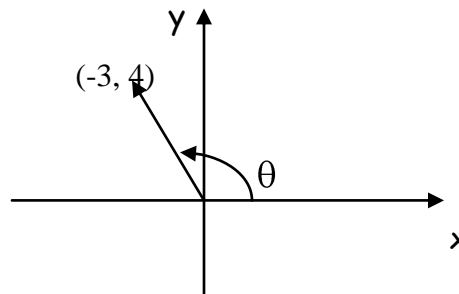
b) $|Z| = \sqrt{x^2 + y^2}$
 $= \sqrt{0 + 2^2}$
 $= 2$

$$\theta = \frac{\pi}{2} = 90^\circ$$



c) $|Z| = \sqrt{x^2 + y^2}$
 $= \sqrt{(-3)^2 + 4^2}$
 $= \sqrt{25} = 5$

$$\theta = \tan^{-1}\left(\frac{y}{x}\right)$$
$$= \tan^{-1}\left(\frac{-3}{4}\right)$$
$$= -53.13^\circ$$
$$= 126.87^\circ$$



$$\begin{aligned} \text{d) } |Z| &= \sqrt{x^2 + y^2} \\ &= \sqrt{1^2 + 2^2} \\ &= \sqrt{5} = 2.236 \end{aligned}$$

$$\begin{aligned} \theta &= \tan^{-1} \left(\frac{y}{x} \right) \\ &= \tan^{-1} \left(\frac{2}{1} \right) \\ &= 63.43^\circ \end{aligned}$$

