

5. Determine the modulus and argument of each of the following complex numbers and express them in polar form.

i)  $5 - 12i$ .

ii)  $-\sqrt{2} + \sqrt{2}i$ .

iii)  $-\sqrt{3} + 3i$ .

i)  $5 - 12i$

$$r = \sqrt{25 + 144} = \sqrt{169} = 13$$

$$\arg(z) = \operatorname{atan2}(y, x) = \arctan(-12/5)$$

ii)  $-\sqrt{2} + \sqrt{2}i$

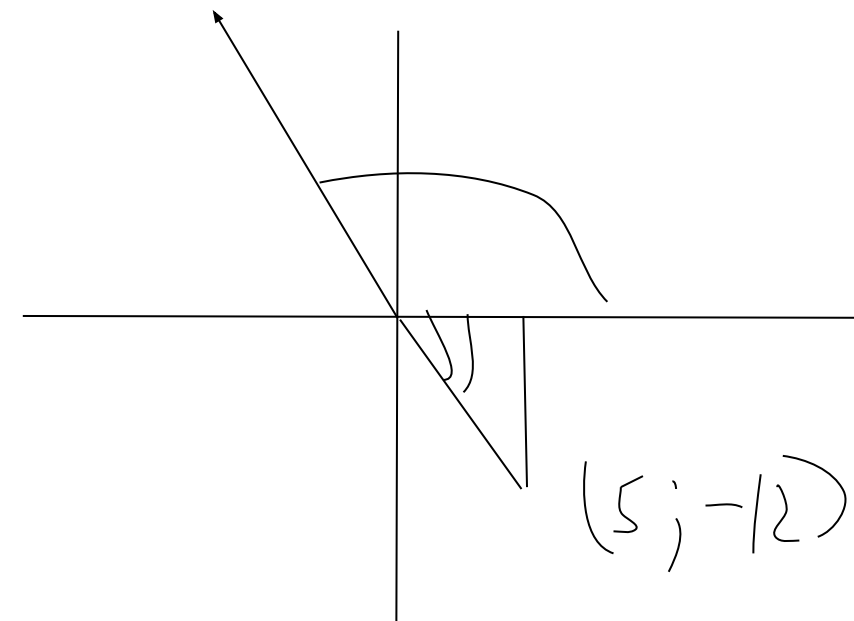
$$r = \sqrt{2 + 2} = \sqrt{4} = 2$$

$$\arg(z) = \operatorname{atan2}(y, x) = \arctan(-1) + \pi = -\pi/4 + \pi = 3\pi/4$$

iii)  $-\sqrt{3} + 3i$

$$r = \sqrt{3 + 9} = \sqrt{12} = 2\sqrt{3}$$

$$\arg(z) = \operatorname{atan2}(y, x) = \arctan(-\sqrt{3}) + \pi = -\pi/3 + \pi = 2\pi/3$$



$$\operatorname{tg}(z) = -12/5$$

$$z = \operatorname{arctg}(-12/5)$$