

PRACTICE EXAM QUESTIONS (I)

1. [6 marks]

Plot P $(2, \pi)$ and Q $(4, -\frac{\pi}{3})$ and hence, find the exact length of \overline{PQ} .

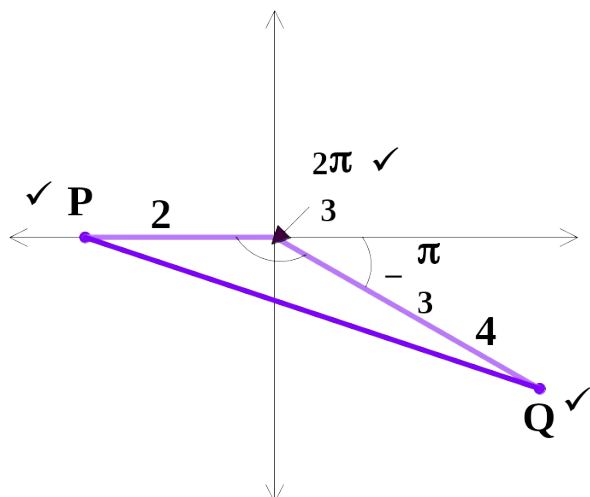
2. [5, 5 = 10 marks]

a) Find the Cartesian co-ordinates of the point with polar co-ordinates $(2, \frac{\pi}{3})$.

b) Transform the Cartesian co-ordinates $(1, -1)$ into polar co-ordinates where $0 < \theta \leq 2\pi$.

PRACTICE EXAM QUESTIONS (I) – SOLUTIONS

1.



$$PQ = \sqrt{2^2 + 4^2 - 2(2)(4) \cos \left(\frac{2\pi}{3}\right)} \quad \checkmark \checkmark$$

$$= 2\sqrt{7} \quad \checkmark$$

2. a) For $(2, \frac{\pi}{3})$,

$$x = r \cos \theta = 2 \cos \frac{\pi}{3} = 1 \quad \checkmark \checkmark$$

$$y = r \sin \theta = 2 \sin \frac{\pi}{3} = \sqrt{3} \quad \checkmark \checkmark$$

\therefore the Cartesian co-ordinates are $(1, \sqrt{3})$. \checkmark

b) For $(1, -1)$,

$$r^2 = x^2 + y^2 = 2 \Rightarrow r = \sqrt{2} \quad \checkmark \checkmark$$

As $(1, -1)$ is in the 4th quadrant, θ must lie in the 4th quadrant. \checkmark

$$\tan \theta = \frac{-1}{1} \Rightarrow \theta = \frac{7\pi}{4} \quad \checkmark$$

\therefore the polar co-ordinates are $(\sqrt{2}, \frac{7\pi}{4})$. \checkmark