

Further Pure 1

Complex Numbers

Exercise E

$$3.(i) \quad x = r \cos \theta = 2 \cos \frac{\pi}{2} = 0$$

$$y = r \sin \theta = 2 \sin \frac{\pi}{2} = 2$$

$$z = 2j$$

$$(ii) \quad x = r \cos \theta = 3 \cos \frac{\pi}{3} = 3 \times \frac{1}{2} = \frac{3}{2}$$

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

$$z = \frac{3}{2} + \frac{3\sqrt{3}}{2}j$$

$$(iii) \quad x = r \cos \theta = 7 \cos \frac{5\pi}{6} = 7 \times -\frac{\sqrt{3}}{2} = -\frac{7\sqrt{3}}{2}$$

$$y = r \sin \theta = 7 \sin \frac{5\pi}{6} = 7 \times \frac{1}{2} = \frac{7}{2}$$

$$z = -\frac{7\sqrt{3}}{2} + \frac{7}{2}j$$

$$(iv) \quad x = r \cos \theta = 1 \cos \left(-\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}$$

$$y = r \sin \theta = 1 \sin \left(-\frac{\pi}{4}\right) = -\frac{1}{\sqrt{2}}$$

$$z = \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}j$$

$$(v) \quad x = r \cos \theta = 5 \cos \left(-\frac{2\pi}{3}\right) = 5 \times -\frac{1}{2} = -\frac{5}{2}$$

$$y = r \sin \theta = 5 \sin \left(-\frac{2\pi}{3}\right) = 5 \times -\frac{\sqrt{3}}{2} = -\frac{5\sqrt{3}}{2}$$

$$z = -\frac{5}{2} - \frac{5\sqrt{3}}{2} j$$

$$(vi) \quad x = r \cos \theta = 6 \cos(-2) = -2.497$$

$$y = r \sin \theta = 6 \sin(-2) = -5.456$$

$$z = -2.497 - 5.456j$$