

3.4 Answers

3.4.1 Solution to Teaching Video Example (3.2 Polar Form $\Rightarrow$ Cartesian Form)

$$\mathbf{r} = \begin{pmatrix} 9.179 \cos 23.8 \\ -9.179 \sin 23.8 \end{pmatrix} = \begin{pmatrix} 8.4 \\ -3.7 \end{pmatrix}$$

[4 marks]

3.4.2 Solutions (3.2 Exercise)

Answer 1

$$\mathbf{a} = \begin{pmatrix} -30.1 \\ 10.9 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} -270 \\ -580 \end{pmatrix} \quad \mathbf{c} = \begin{pmatrix} -49.6 \\ 136.26 \end{pmatrix} \quad \mathbf{d} = \begin{pmatrix} 1.3 \\ -2.3 \end{pmatrix} \quad \mathbf{e} = \begin{pmatrix} 4.02 \\ 12.3 \end{pmatrix}$$

[4, 4, 4, 4, 4 marks]

Answer 2

$$\mathbf{f} = \begin{pmatrix} -23.8 \\ 21.4 \end{pmatrix} \quad \mathbf{g} = \begin{pmatrix} 69.5 \\ -35.4 \end{pmatrix} \quad \mathbf{h} = \begin{pmatrix} -53.6 \\ -89.1 \end{pmatrix} \quad \mathbf{k} = \begin{pmatrix} 0.12 \\ -0.27 \end{pmatrix} \quad \mathbf{l} = \begin{pmatrix} 1662.9 \\ 353.4 \end{pmatrix}$$

[4, 4, 4, 4, 4 marks]

Answer 3

$$\mathbf{a} + \mathbf{b} = \begin{pmatrix} -7 \\ 3 \end{pmatrix} + \begin{pmatrix} 4 \\ 1 \end{pmatrix} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$$

This has magnitude 5 and direction 126.9°

[4 marks]

Answer 4

$$\mathbf{c} - \mathbf{d} = \begin{pmatrix} 17 \\ -3 \end{pmatrix} - \begin{pmatrix} 12 \\ 9 \end{pmatrix} = \begin{pmatrix} 5 \\ -12 \end{pmatrix}$$

This has magnitude 13 and direction 292.6°

[4 marks]

Answer 5

A vector, $\mathbf{m}$, of magnitude $|\mathbf{m}|$ and direction θ can be written as :

$$\mathbf{m} = \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} |\mathbf{m}| \cos \theta \\ |\mathbf{m}| \sin \theta \end{pmatrix}$$

[2 marks]