

QUIZ 4

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1 PROBLEM 1

1. Find the slope of a line, which passes through the origin, and the mid-point of the line segment joining the points $\mathbf{P} = \begin{pmatrix} 0 \\ -4 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} 8 \\ 0 \end{pmatrix}$

SOLUTION:

$$\text{Given, } \mathbf{P} = \begin{pmatrix} 0 \\ -4 \end{pmatrix}, \mathbf{Q} = \begin{pmatrix} 8 \\ 0 \end{pmatrix}$$

The mid-point is given by,

$$\mathbf{Q} = \frac{\mathbf{P} + \mathbf{B}}{2} \quad (1.0.1)$$

$$= \frac{1}{2}\mathbf{P} + \frac{1}{2}\mathbf{B} \quad (1.0.2)$$

$$= \frac{1}{2} \begin{pmatrix} 0 \\ -4 \end{pmatrix} + \frac{1}{2} \begin{pmatrix} 8 \\ 0 \end{pmatrix} \quad (1.0.3)$$

$$= \begin{pmatrix} 4 \\ -2 \end{pmatrix} \quad (1.0.4)$$

Direction vector :

$$\mathbf{m} = \mathbf{Q} - \mathbf{0} \quad (1.0.5)$$

$$= \begin{pmatrix} 0 \\ -4 \end{pmatrix} + \begin{pmatrix} 0 \\ 0 \end{pmatrix} \quad (1.0.6)$$

$$= \begin{pmatrix} 4 \\ -2 \end{pmatrix} \quad (1.0.7)$$

The desired slope is:

$$\mathbf{m} = \begin{pmatrix} 1 \\ m \end{pmatrix} \quad (1.0.8)$$

$$= \frac{-2}{4} \quad (1.0.9)$$