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:

Given,

$$\mathbf{P} = \begin{pmatrix} 0 \\ -4 \end{pmatrix} \tag{1.0.1}$$

$$\mathbf{Q} = \begin{pmatrix} 8 \\ 0 \end{pmatrix} \tag{1.0.2}$$

The mid-point is given by,

$$\mathbf{Q} = \frac{\mathbf{P} + \mathbf{B}}{2} \tag{1.0.3}$$

$$= \frac{1}{2}\mathbf{P} + \frac{1}{2}\mathbf{B} \tag{1.0.4}$$

$$= \frac{1}{2}\begin{pmatrix} 0 \\ -4 \end{pmatrix} + \frac{1}{2}\begin{pmatrix} 8 \\ 0 \end{pmatrix} \tag{1.0.5}$$

$$= \begin{pmatrix} 4 \\ -2 \end{pmatrix} \tag{1.0.6}$$

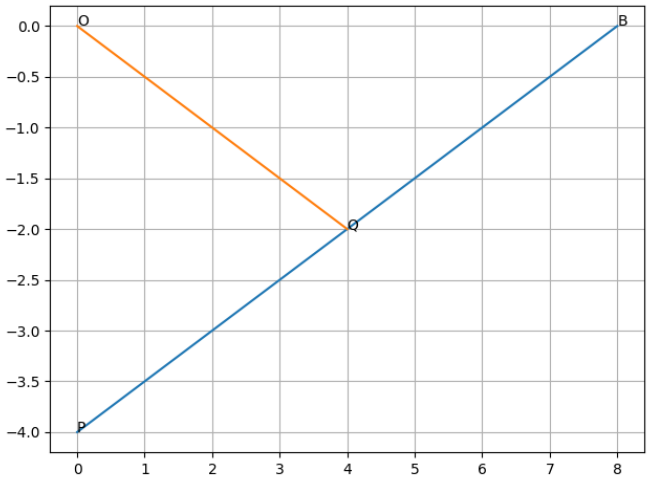

Fig. 0: Point represented by 1.0.6

Direction vector is given by,

$$\mathbf{m} = \mathbf{Q} - \mathbf{0} \tag{1.0.7}$$

$$= \begin{pmatrix} 0 \\ -4 \end{pmatrix} + \begin{pmatrix} 0 \\ 0 \end{pmatrix} \tag{1.0.8}$$

$$= \begin{pmatrix} 4 \\ -2 \end{pmatrix} \tag{1.0.9}$$

The slope of the line with direction

$$\mathbf{m} = \frac{m_2}{m_1} \tag{1.0.10}$$

$$= \frac{-2}{4} \tag{1.0.11}$$

$$= \frac{-1}{2} \tag{1.0.12}$$