VECTOR ASSIGNMENT

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1 PROBLEM 1

1. Find the position vector of the mid point of the vector joining the points $\mathbf{P} = \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix}$ and $\mathbf{Q} = \begin{pmatrix} 4 \\ 1 \\ -2 \end{pmatrix}$.

SOLUTION:

Given,
Let the midpoint of PQ be R Position vector of P is given by:

$$\mathbf{OP} = \mathbf{P} - \mathbf{0} \qquad (1.0.1)$$

$$= \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix} - \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \qquad (1.0.2)$$

$$= \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix} \qquad (1.0.3)$$

Position vector of Q is given by:

$$\mathbf{OQ} = \mathbf{Q} - \mathbf{0} \qquad (1.0.4)$$

$$= \begin{pmatrix} 4 \\ 1 \\ -2 \end{pmatrix} - \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \qquad (1.0.5)$$

$$= \begin{pmatrix} 4 \\ 1 \\ -2 \end{pmatrix} \qquad (1.0.6)$$

Position vector of R is given by:

$$\mathbf{OR} = \frac{1}{2}(\mathbf{OP} + \mathbf{OQ}) \qquad (1.0.7)$$

$$= \frac{1}{2}\begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix} + \frac{1}{2}\begin{pmatrix} 4 \\ 1 \\ -2 \end{pmatrix} \qquad (1.0.8)$$

$$= \begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix} \qquad (1.0.9)$$