

ASSIGNMENT-1

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Question: Calculate the ratio in which the line joining $A = \begin{pmatrix} -4 \\ 2 \end{pmatrix}$ and $B = \begin{pmatrix} 3 \\ 6 \end{pmatrix}$ is divided by the point $P = \begin{pmatrix} x^* \\ 3 \end{pmatrix}$. Also find

- 1) x^*
- 2) Length of \overrightarrow{AP}

Solution: The ratio in which the line is divided by the point is 1:3.

- 1) Now let's find the point $P = \begin{pmatrix} x^* \\ 3 \end{pmatrix}$ by using the section formula

$$P = \left[\frac{(1 \times B) + (3 \times A)}{1 + 3} \right] \quad (0.0.1)$$

$$= \left[\frac{\left[1 \times \begin{pmatrix} 3 \\ 6 \end{pmatrix} \right] + \left[3 \times \begin{pmatrix} -4 \\ 2 \end{pmatrix} \right]}{1 + 3} \right] \quad (0.0.2)$$

$$= \left[\frac{(1 \times 3) + [3 \times (-4)]}{1 + 3}, \frac{(1 \times 6) + (3 \times 2)}{1 + 3} \right] \quad (0.0.3)$$

$$= \left(\frac{-9}{4}, \frac{12}{4} \right) \quad (0.0.4)$$

$$= (-2.25, 3) \quad (0.0.5)$$

Therefore, the value of $x^* = -2.25$.

- 2) The length of the line \overrightarrow{AP} can be measured by the distance formula.

$$length = \sqrt{(-4 - (-2.25))^2 + (2 - 3)^2} \quad (0.0.6)$$

$$= 2.015 \quad (0.0.7)$$

The length of the line $\overrightarrow{AP} = 2.015$ (Approx).

