ASSIGNMENT-1

Nwjwr Khungur Brahma

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

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

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

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

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

$$= (-2.25, 3) \tag{5}$$

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

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

$$length = \sqrt[2]{(-4 - (-2.25))^2 + (2 - 3)^2} \tag{6}$$

$$= 2.015 \tag{7}$$

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