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

$$\mathbf{P} = \left(\frac{(1\times \mathbf{B})+(3\times \mathbf{A})}{1+3}\right) \tag{0.0.1}$$

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

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

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

$$= (-2.25, 3) \tag{0.0.5}$$

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

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

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

$$= 2.015 \tag{0.0.7}$$

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