

# 1 - 1.4 - 3

AI24BTECH11025 - PEDAPROLU LAKSHMI KUSHAL

## Question:

Find the ratio in which the point  $P\left(\frac{3}{4}, \frac{5}{12}\right)$  divides the line segment joining the points  $A\left(\frac{1}{2}, \frac{3}{2}\right)$  and  $B(2, -5)$ .

## Solution:

To find the ratio  $m : n$  in which the point  $P\left(\frac{3}{4}, \frac{5}{12}\right)$  divides the line segment joining the points  $A\left(\frac{1}{2}, \frac{3}{2}\right)$  and  $B(2, -5)$ , we use the section formula.

Let the ratio be  $m : n$ .

The coordinates of the point  $P$  dividing the line segment joining  $A$  and  $B$  are given by:

$$\left(\frac{m \cdot x_2 + n \cdot x_1}{m + n}, \frac{m \cdot y_2 + n \cdot y_1}{m + n}\right)$$

Substituting the given coordinates:

$$\left(\frac{m \cdot 2 + n \cdot \frac{1}{2}}{m + n}, \frac{m \cdot (-5) + n \cdot \frac{3}{2}}{m + n}\right) = \left(\frac{3}{4}, \frac{5}{12}\right)$$

Equating the corresponding coordinates:

$$\frac{m \cdot 2 + n \cdot \frac{1}{2}}{m + n} = \frac{3}{4}$$

let this be equation 1.

$$\frac{m \cdot (-5) + n \cdot \frac{3}{2}}{m + n} = \frac{5}{12}$$

and let this equation be equation 2.

The first equation can be rearranged as  $m \cdot 8 + n \cdot 2 = m \cdot 3 + n \cdot 3$  which upon further simplification gives  $5m = n$ .

Even the second equation gives the same result.

Therefore the ratio  $m : n$  in which the point  $P$  divides the line segment joining  $A$  and  $B$  in  $1 : 5$ .

Hence , the answer is **1:5** .