

# 1.1.4.10

EE24BTECH11032 - John Bobby

**Question:** If  $P(9a - 2, -b)$  divides the line segment joining  $A(3a + 1, -3)$  and  $B(8a, 5)$  in the ratio  $3 : 1$ , find the values of  $a$  and  $b$ .

**Solution:** As  $P$  lies between  $A$  and  $B$ ,  $P$  can be represented as

$$P = \frac{kB + A}{k + 1} \quad (0.1)$$

where  $k$  is the ratio, here  $k=3$

$$P = \frac{3B + A}{4} = \frac{3 \begin{pmatrix} 8a \\ 5 \end{pmatrix} + \begin{pmatrix} 3a + 1 \\ -3 \end{pmatrix}}{4} = \frac{\begin{pmatrix} 27a + 1 \\ 12 \end{pmatrix}}{4} \quad (0.2)$$

$$P = \begin{pmatrix} 9a - 2 \\ -b \end{pmatrix} \quad (0.3)$$

on equating both sides

$a = 1$  and  $b = -3$

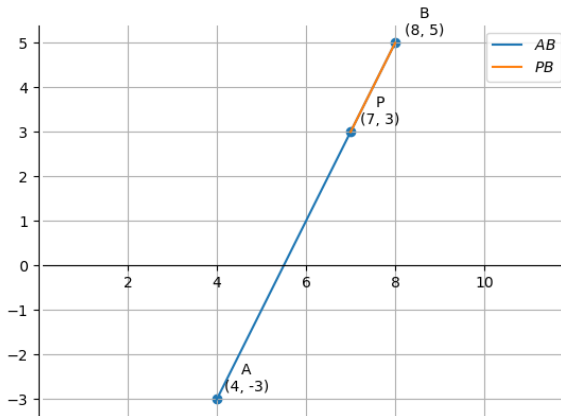


Fig. 0.1: Plot of points **A**, **B** and **P**