1-1.4-4

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1) Find the coordinates of the point which divides the line segment joining the points $(4, -3)$ and $(8, 5)$ in the ratio $3 : 1$ internally

Solution:

Variable	Description
A	position vector of point (4, -3)
B	position vector of point (8, 5)
P	position vector of point whhich divides points A and B in the ratio 3:1

TABLE I: Variables Used

Let the position vectors of the points $(4, -3)$ and $(8, 5)$ be represented as A and B respectively. Therefore, we have:

$$A = 4i - 3j \tag{1}$$

$$B = 8i + 5j \tag{2}$$

Let the position vector of the point P that divides the line segment AB in the ratio 3:1 internally be P.

Using the section formula in vector form, the position vector P is given by:

$$P = \frac{mB + nA}{m + n} \tag{3}$$

where m = 3 and n = 1

Substituting the values, we get:

$$P = \frac{3(8i + 5j) + 1(4i - 3j)}{3 + 1} \tag{4}$$

$$P = \frac{(24i + 15j) + (4i - 3j)}{4} \tag{5}$$

$$P = \frac{(24i + 4i) + (15j - 3j)}{4} \tag{6}$$

$$P = \frac{28i + 12j}{4} \tag{7}$$

$$P = 7i + 3j \tag{8}$$

Therefore, the coordinates of the point are (7, 3).