

LINE

1 11th Maths - EXERCISE-10.4

1. What are the points on the y-axis whose distance from the line $\frac{x}{3} + \frac{y}{4} = 1$ is 4 units.

2 SOLUTION

Given line equation is

$$\frac{x}{3} + \frac{y}{4} = 1 \quad (1)$$

$$(4x + 3y - 12) = 0 \quad (2)$$

$$\mathbf{n} = \begin{pmatrix} 4 \\ 3 \end{pmatrix} \quad (3)$$

$$c = 12 \quad (4)$$

The distance of the line from y-axis

$$d = \frac{\mathbf{n}^T \mathbf{P} - c}{|\mathbf{n}|} \quad (5)$$

$$\Rightarrow \pm 4 = \frac{(4 \ 3) \begin{pmatrix} 0 \\ y \end{pmatrix} - 12}{5} \quad (6)$$

$$\Rightarrow \pm 4 = \frac{\begin{pmatrix} 0 \\ 3y \end{pmatrix} - 12}{5} \quad (7)$$

$$\Rightarrow \pm 20 = 3y - 12 \quad (8)$$

$$\Rightarrow 3y = 20 \pm 12 \quad (9)$$

$$\Rightarrow y = \frac{32}{3} \text{ or } \frac{-8}{3} \quad (10)$$

3 FIGURE

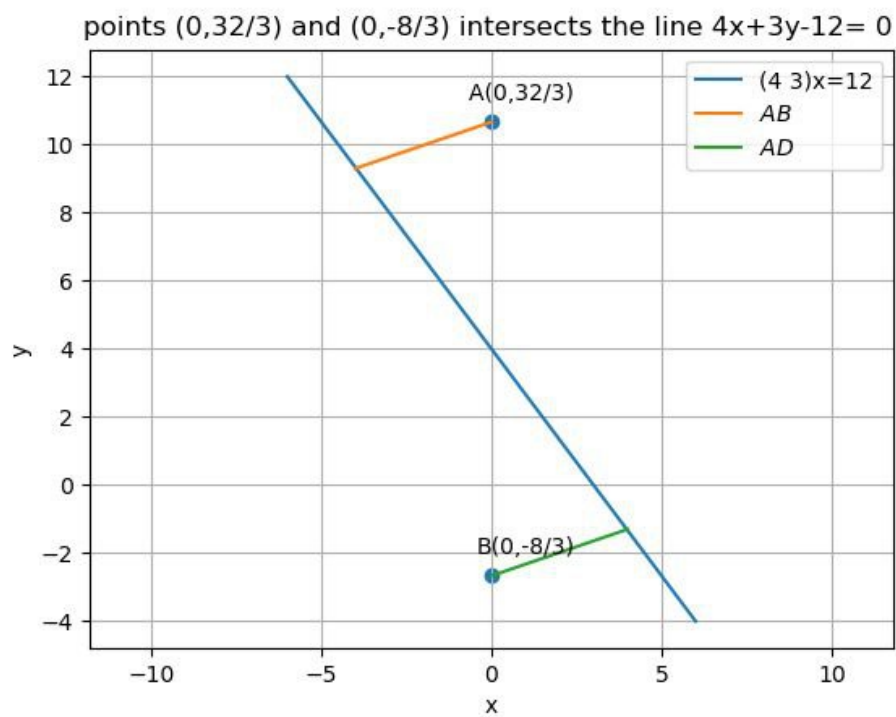


Figure 1: line