LINE

1 11^{th} 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

$$\frac{x}{3}+\frac{y}{4}=1 \tag{1}$$

$$\big(4\mathbf{x}+3\mathbf{y}-12\big)=0 \tag{2}$$

$$\mathbf{n}=\begin{pmatrix}4\\3\end{pmatrix} \tag{3}$$

$$\mathbf{d}=4 \tag{4}$$

The distance of the line from y-axis

$$\mathbf{d}=\frac{\mathbf{n}^{\top}\mathbf{P}-\mathbf{c}}{\|\mathbf{n}\|} \tag{5}$$

$$4=\pm\frac{\begin{pmatrix}4 & 3\end{pmatrix}\begin{pmatrix}0\\y\end{pmatrix}-12}{5} \tag{6}$$

$$4=\pm\frac{\begin{pmatrix}0\\3y\end{pmatrix}-12}{5} \tag{7}$$

$$20=\pm 3y-12 \tag{8}$$

$$3y=20\pm 12 \tag{9}$$

$$y=\big(\tfrac{32}{3}\big)\ \big(\tfrac{-8}{3}\big) \tag{10}$$

Thus, the required points are $\begin{pmatrix}0 & \frac{32}{3}\end{pmatrix}$ and $\begin{pmatrix}0 & \frac{-8}{3}\end{pmatrix}$

3 FIGURE

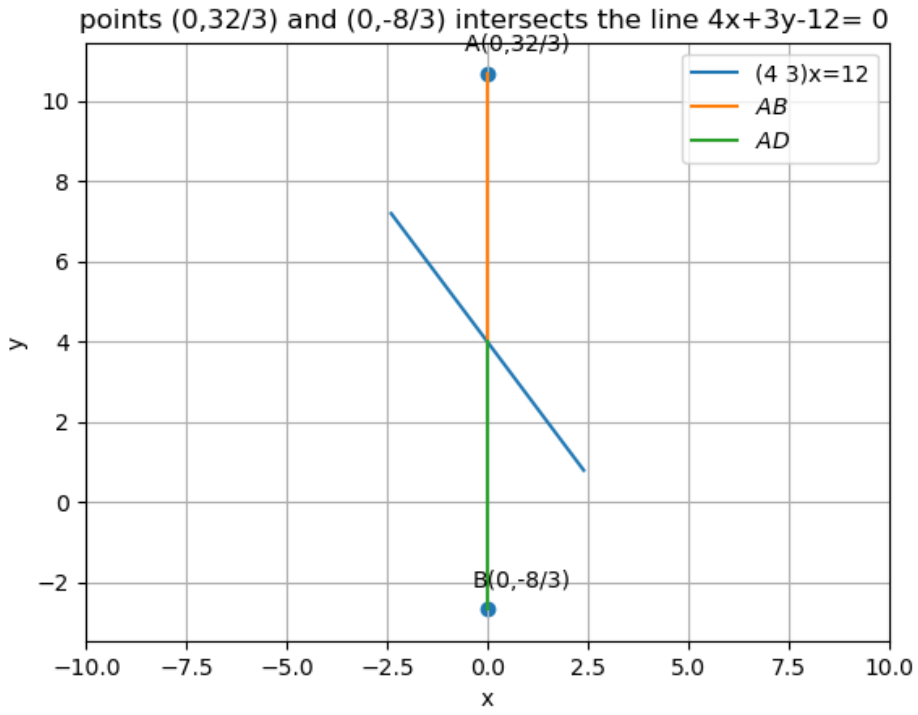

Figure 1: line