LINES

11^{th} Maths - EXERCISE-10.4

Find the equations of the lines, which cutoff intercepts on the axes whose sum and product are 1 and -6 respectively.
Solution: Let the intercepts of x and y are a and b
Given

$$a+b=1 \tag{1}$$
$$ab=-6 \tag{2}$$

on solving (1) and (2) we get

$$\implies a=3, b=-2 \text{ or } a=-2, b=3$$

Thus,the possible intercepts are

$$\mathbf{a}=\begin{pmatrix}3\\0\end{pmatrix}, \mathbf{b}=\begin{pmatrix}0\\-2\end{pmatrix} \tag{3}$$
$$\mathbf{c}=\begin{pmatrix}-2\\0\end{pmatrix}, \mathbf{d}=\begin{pmatrix}0\\3\end{pmatrix} \tag{4}$$

$$\mathbf{m}=\mathbf{a}-\mathbf{b} \tag{5}$$
$$=\begin{pmatrix}3\\0\end{pmatrix}-\begin{pmatrix}0\\-2\end{pmatrix} \tag{6}$$
$$=\begin{pmatrix}3\\2\end{pmatrix} \tag{7}$$
$$\mathbf{m}=\begin{pmatrix}3\\2\end{pmatrix} \text{ or, } \begin{pmatrix}-2\\3\end{pmatrix} \tag{8}$$

1. For

$$\mathbf{n}=\begin{pmatrix}-2\\3\end{pmatrix} \tag{9}$$
$$\tag{10}$$

the equation of the line will be

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{A}) = 0 \tag{11}$$
$$\begin{pmatrix} -2 & 3 \end{pmatrix} \mathbf{x} = 6 \tag{12}$$

2. For

$$\mathbf{n} = \begin{pmatrix} -3 \\ -2 \end{pmatrix} \tag{13}$$
$$\tag{14}$$

the equation of the line will be

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{B}) = 0 \tag{15}$$
$$\begin{pmatrix} -3 & -2 \end{pmatrix} \mathbf{x} = 6 \tag{16}$$

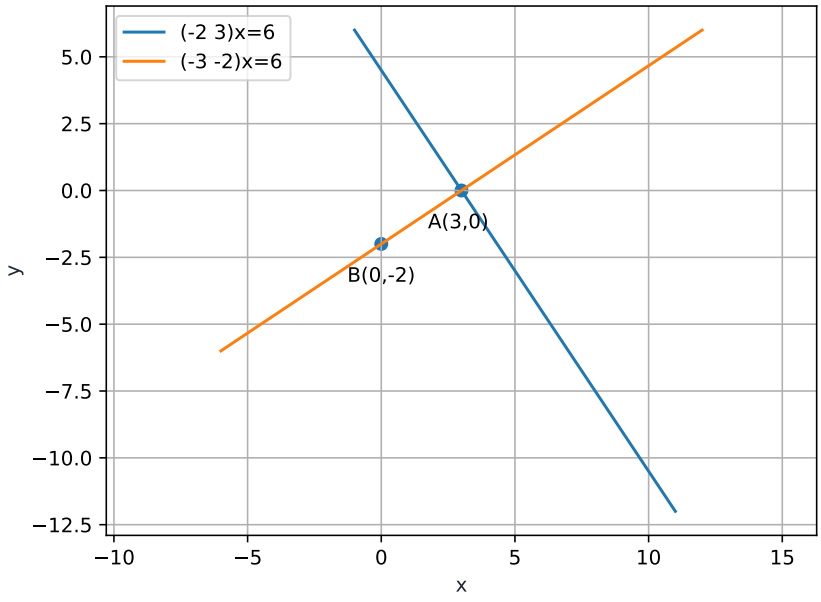

Figure 1