

LINES

11th 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

$$a + b = 1 \quad (1)$$

$$ab = -6 \quad (2)$$

on solving (1) and (2) we get

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

Thus, the possible intercepts are

$$\mathbf{a} = \begin{pmatrix} 3 \\ 0 \end{pmatrix}, \mathbf{b} = \begin{pmatrix} 0 \\ -2 \end{pmatrix} \quad (3)$$

$$\mathbf{c} = \begin{pmatrix} -2 \\ 0 \end{pmatrix}, \mathbf{d} = \begin{pmatrix} 0 \\ 3 \end{pmatrix} \quad (4)$$

$$\mathbf{m} = \mathbf{a} - \mathbf{b} \quad (5)$$

$$= \begin{pmatrix} 3 \\ 0 \end{pmatrix} - \begin{pmatrix} 0 \\ -2 \end{pmatrix} \quad (6)$$

$$= \begin{pmatrix} 3 \\ 2 \end{pmatrix} \quad (7)$$

$$\mathbf{m} = \begin{pmatrix} 3 \\ 2 \end{pmatrix} \text{ or, } \begin{pmatrix} -2 \\ -3 \end{pmatrix} \quad (8)$$

1. For

$$\mathbf{n} = \begin{pmatrix} 2 \\ -3 \end{pmatrix} \quad (9)$$

$$(10)$$

the equation of the line will be

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{A}) = 0 \quad (11)$$

$$(2 \quad -3) \mathbf{x} = -6 \quad (12)$$

2. For

$$\mathbf{n} = \begin{pmatrix} -3 \\ 2 \end{pmatrix} \quad (13)$$

$$(14)$$

the equation of the line will be

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{B}) = 0 \quad (15)$$

$$(-3 \quad 2) \mathbf{x} = -6 \quad (16)$$

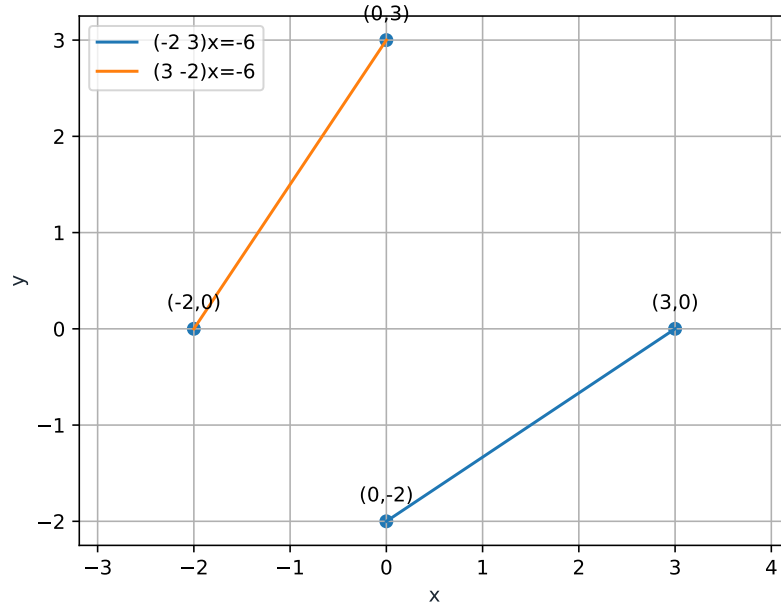


Figure 1