

# chapter-11

## 1 Exercise 10.4.7

1. Find the equation of line drawn perpendicular to the line  $\frac{x}{4} + \frac{y}{6} = 1$  through the point where it meets the y-axis

## 2 Solution

The given equation can be arranged as

$$3x + 2y - 12 = 0 \quad (1)$$

The (1) can be expressed as

$$\mathbf{n}^\top \mathbf{x} = c \quad (2)$$

$$\text{where } \mathbf{n} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}, c = 12 \quad (3)$$

the equation of line perpendicular where it meets  $y$ -axis through point(0,6)

$$\mathbf{m}^\top (\mathbf{x} - \mathbf{A}) = 0 \quad (4)$$

where  $\mathbf{A}$  and  $\mathbf{m}$  is

$$\mathbf{m}^\top = \begin{pmatrix} -2 & 3 \end{pmatrix} \quad (5)$$

$$\mathbf{A} = \begin{pmatrix} 0 \\ 6 \end{pmatrix} \quad (6)$$

Substituting the value of  $\mathbf{m}$  and  $\mathbf{A}$  in (4)

$$\begin{pmatrix} -2 & 3 \end{pmatrix} \left( \mathbf{x} - \begin{pmatrix} 0 \\ 6 \end{pmatrix} \right) = 0 \quad (7)$$

$$\begin{pmatrix} -2 & 3 \end{pmatrix} \mathbf{x} = -18 \quad (8)$$

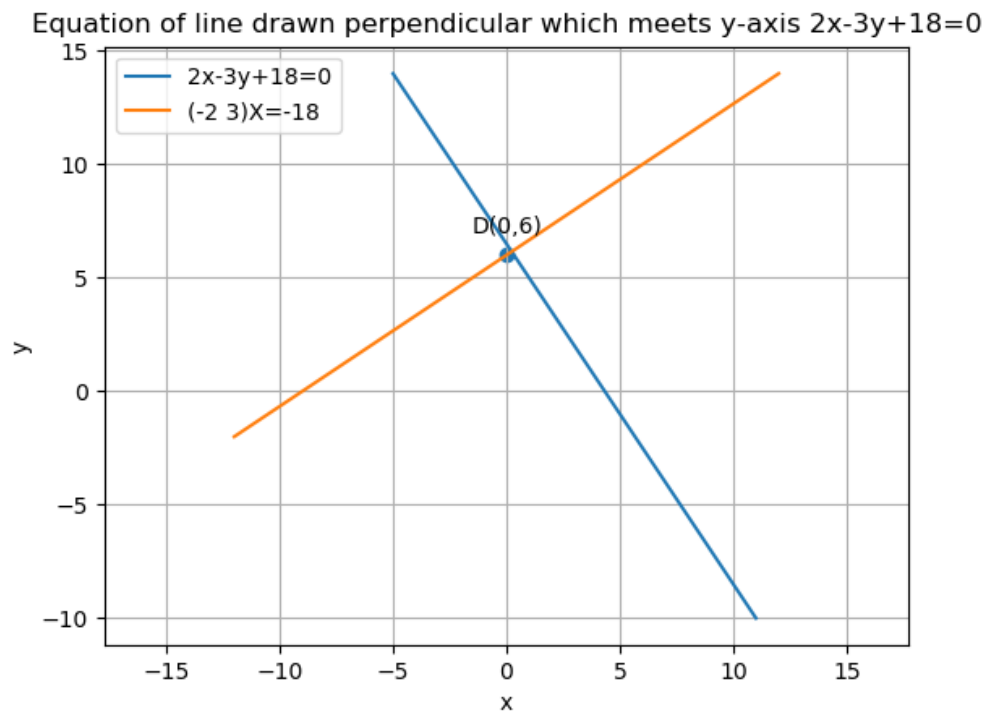


Figure 1