

# Equation of Line

**1 11<sup>th</sup> Maths - Chapter 10** From the line equation we find  $c$  value is

**This is Problem-15 from Exercise 10.3**

1. The perpendicular from the origin to the line  $y=mx+c$  meets it at the point  $(-1,2)$  find value of  $\mathbf{m}$  and  $c$ .

Solution:

The line equation and points are

$$\mathbf{y} = \mathbf{mx} + c \quad (1)$$

$$\mathbf{p} = \begin{pmatrix} -1 \\ 2 \end{pmatrix} \quad (2)$$

$$\mathbf{o} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \quad (3)$$

$$\mathbf{n} = \begin{pmatrix} m \\ -1 \end{pmatrix} \quad (4)$$

The equation of line is

$$\mathbf{n}^\top \mathbf{x} = c \quad (5)$$

$$(m \quad -1) \mathbf{x} = c \quad (6)$$

$$\mathbf{m} = \begin{pmatrix} -1 \\ -m \end{pmatrix} \quad (7)$$

The directional vector  $\mathbf{OP}$  is

$$(\mathbf{o} - \mathbf{p})^\top \mathbf{m} = 0 \quad (8)$$

$$(-1 \quad 2) \begin{pmatrix} -1 \\ -m \end{pmatrix} = 0 \quad (9)$$

$$\mathbf{m} = \frac{1}{2} \quad (10)$$

$$\begin{pmatrix} \frac{1}{2} \\ -1 \end{pmatrix} \begin{pmatrix} -1 \\ 2 \end{pmatrix} = c \quad (11)$$

$$\begin{pmatrix} -\frac{1}{2} & -2 \end{pmatrix} = c \quad (12)$$

$$c = \frac{-1 - 4}{2} \quad (13)$$

$$c = \frac{-5}{2} \quad (14)$$

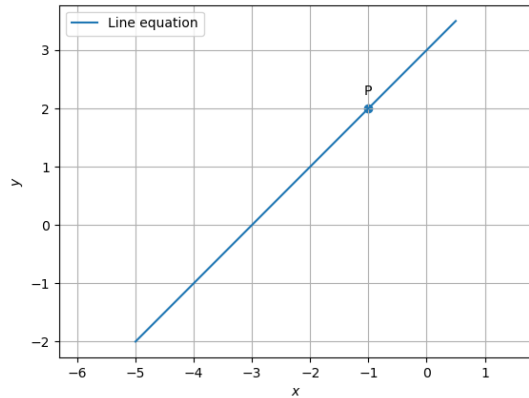


Figure 1