

# Linear Forms

## 11<sup>th</sup> Maths - Chapter 10

The following problem is question 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 the values of  $m$  and  $c$ .

**Solution:**

Given Equation ,

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

The direction vector  $d = (1, m)$

Vector from Origin to point  $p(-1, 2)$  is

$$\mathbf{OP} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$$

If the lines are perpendicular then,

$$\mathbf{OP} \cdot \mathbf{d} = 0 \tag{2}$$

$$\begin{pmatrix} -1 \\ 2 \end{pmatrix} \cdot (1, m) = 0$$

$$-1 + 2m = 0 \tag{3}$$

$$m = \frac{1}{2} \tag{4}$$

$$\tag{5}$$

$$\text{Equation(1)} \implies 2 = \frac{1}{2} (-1) + c$$

$$c = \frac{5}{2}$$

therefore, Values of m and c are  $\frac{1}{2}$  and  $\frac{5}{2}$

The equation becomes  $y = \frac{1}{2}(x) + c$

$$\begin{aligned} \frac{-1}{2}(x) + y &= \frac{5}{2} \\ \text{therefore, } \begin{pmatrix} -1/2 \\ 1 \end{pmatrix} (xy) &= \frac{5}{2} \end{aligned} \tag{6}$$

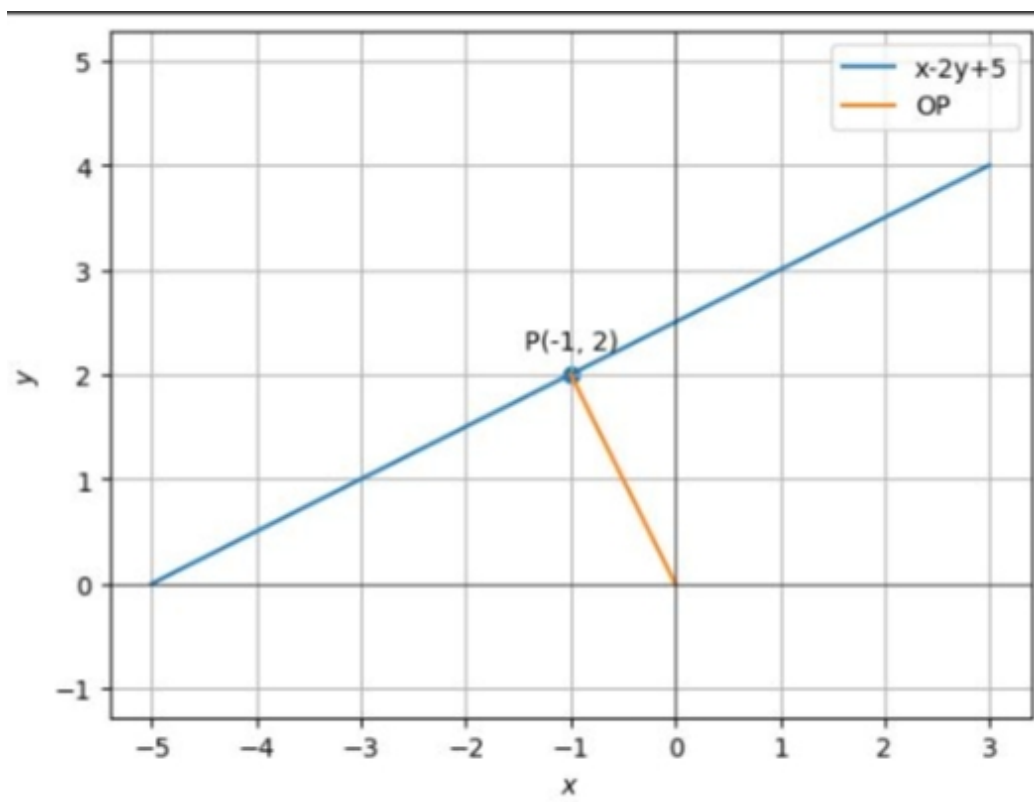


Figure 1: Graph