## STRAIGHT LINES

## $1 \quad 11^{th} \text{ Maths}$ - Chapter 10

This is Problem 11 from Exercise-10.3

1. Prove that the line through the point $(x_1, y_1)$  and parallel to the line Ax+By+C=0 is  $A(x-x_1)+B(y-y_1)=0$ .

Solution: Given

Let 
$$\mathbf{P} = \begin{pmatrix} x_1 \\ y_1 \end{pmatrix}$$
 (1)

$$Ax + By + C = 0 (2)$$

The line equation is

$$\mathbf{n}^{\top}\mathbf{x} = c \tag{3}$$

from (2)

$$\mathbf{n} = \begin{pmatrix} A \\ B \end{pmatrix} \tag{4}$$

The line passing through the **P** is parallel to line Ax + By + C = 0. The line equation for line passing through **P** is

$$\mathbf{n}^{\top}\mathbf{m} = 0 \tag{5}$$

$$\mathbf{n}^{\top} \left( \mathbf{x} - \mathbf{P} \right) = 0 \tag{6}$$

$$(A \quad B)\left(\begin{pmatrix} x \\ y \end{pmatrix} - \begin{pmatrix} x_1 \\ y_1 \end{pmatrix}\right) = 0 \tag{7}$$

$$\begin{pmatrix} A & B \end{pmatrix} \begin{pmatrix} x - x_1 \\ y - y_1 \end{pmatrix} = 0 \tag{8}$$

$$A(x - x_1) + B(y - y_1) = 0 (9)$$

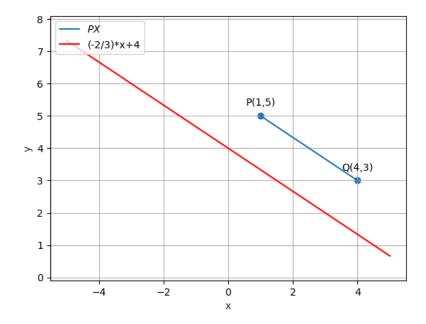


Figure 1