LINE

1 11th Maths - EXERCISE-10.3

1. The line through the points (h, 3) and (4, 1) intersects the line 7x- 9y-19= 0 at right angle. Find the value of h.

2 SOLUTION

Given points are P=$\begin{pmatrix} h \\ 3 \end{pmatrix}$,Q=$\begin{pmatrix} 4 \\ 1 \end{pmatrix}$,B=$\begin{pmatrix} 9 \\ 7 \end{pmatrix}$

$$\mathbf{A} = \mathbf{Q} - \mathbf{P} = \begin{pmatrix} 4 \\ 1 \end{pmatrix} - \begin{pmatrix} h \\ 3 \end{pmatrix} \tag{1}$$

$$\mathbf{A} = \begin{pmatrix} 4 - h \\ -2 \end{pmatrix} \tag{2}$$

The formula for the line

$$\theta = 90° \tag{3}$$

$$cos\theta = 90° = 0 \tag{4}$$

$$cos\theta = \frac{\mathbf{A}^\top \mathbf{B}}{\|A\| \, \|B\|} \tag{5}$$

$$= \begin{pmatrix} 4 - h & -2 \end{pmatrix} \begin{pmatrix} 9 \\ 7 \end{pmatrix} \tag{6}$$

$$= 9 \left(4 - h \right) - 14 \tag{7}$$

$$22 = 9h \tag{8}$$

$$h = \frac{22}{9} \tag{9}$$

3 Figure

points (2.4,3) and (4,1) intersects the line 7x-9y19= 0 at right angle

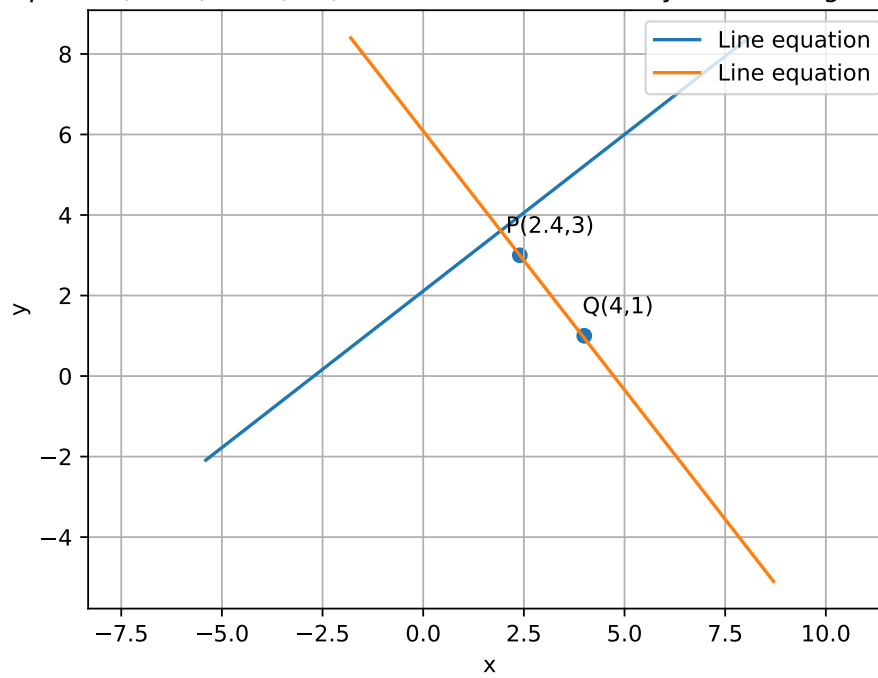Figure 1: line