LINE

1 11^{th} 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

$$\mathbf{A} = \begin{pmatrix} h \\ 3 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 4 \\ 1 \end{pmatrix} \tag{1}$$

$$\mathbf{P} = \mathbf{B} - \mathbf{A} = \begin{pmatrix} 4 \\ 1 \end{pmatrix} - \begin{pmatrix} h \\ 3 \end{pmatrix} \tag{2}$$

$$\mathbf{P} = \begin{pmatrix} 4-h \\ -2 \end{pmatrix} \tag{3}$$

The given line equation is

$$7x - 9y - 19 = 0 \tag{4}$$

$$\begin{pmatrix} 7 \\ -9 \end{pmatrix} x = 19 \tag{5}$$

$$\mathbf{n} = \begin{pmatrix} 7 \\ -9 \end{pmatrix} \tag{6}$$

$$\mathbf{m} = \begin{pmatrix} 9 \\ 7 \end{pmatrix} \tag{7}$$

$$\mathbf{m}^\top \mathbf{P} = 0 \tag{8}$$

$$\begin{pmatrix} 9 & 7 \end{pmatrix} \begin{pmatrix} 4-h \\ -2 \end{pmatrix} = 0 \tag{9}$$

$$36 - 9h - 14 = 0 \tag{10}$$

$$36 - 14 = 9h \tag{11}$$

$$h = \frac{22}{9} \tag{12}$$

3 Figure

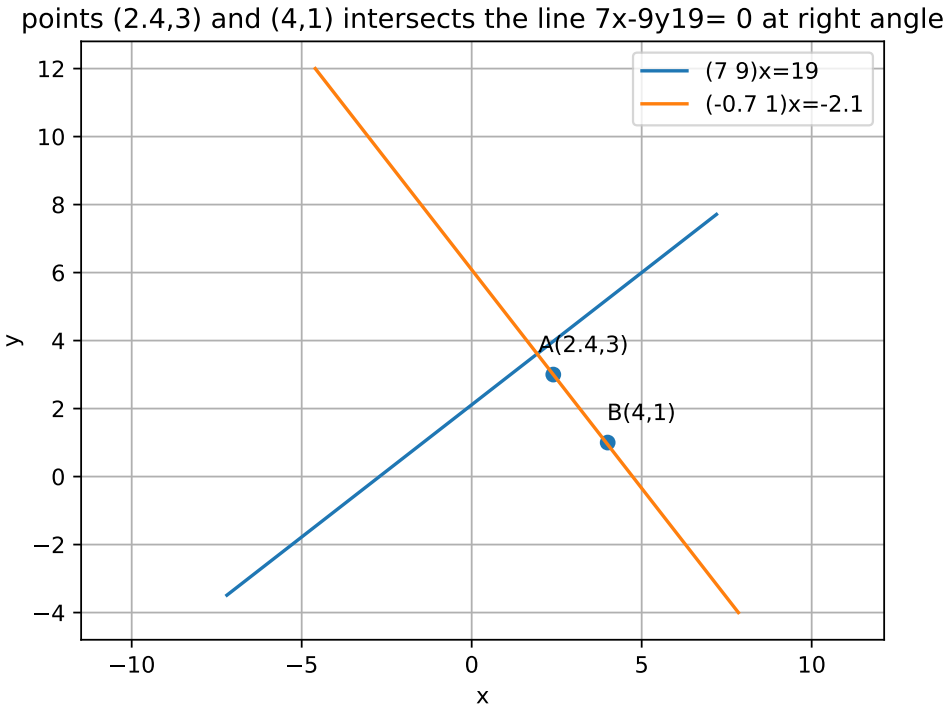

Figure 1: line