LINE

1   11th Maths - EXERCISE-10.2

Q4. Passing through $(2, 2\sqrt{3})$ and inclined with the x-axis at an angle of $75°$

2   SOLUTION

Given points are

$$\mathbf{p} = \begin{pmatrix} 2 \\ 2\sqrt{3} \end{pmatrix}, m = tan75° = 2 + \sqrt{3} \tag{1}$$

The line formula in matrix form

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{p}) = 0 \tag{2}$$

$$n = \begin{pmatrix} 1 \\ \frac{1}{m} \end{pmatrix} \tag{3}$$

$$\begin{pmatrix} 1 & \frac{1}{2+\sqrt{3}} \end{pmatrix} (\mathbf{x} - \mathbf{p}) \tag{4}$$

Figure 1: line

$$\begin{pmatrix} 1 & \frac{1}{2+\sqrt{3}} \end{pmatrix} \begin{pmatrix} x - 2 \\ y - 2\sqrt{3} \end{pmatrix} \tag{5}$$

The required line equation is

$$(2 + \sqrt{3})\mathbf{x} - \mathbf{y} - 4 = 0 \tag{6}$$
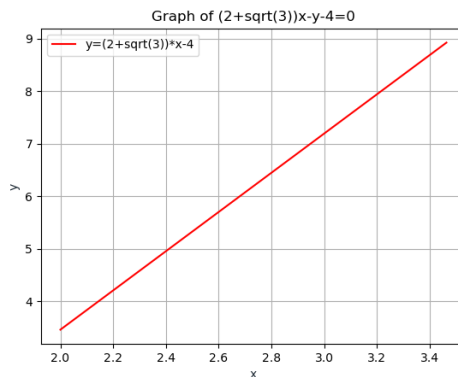
3   Figure