

# L<sup>A</sup>T<sub>E</sub>X 11.10.1.7

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## CLASS 11, EXERCISE 10.1

Q7. Find the slope of the line, which makes an angle of  $30^\circ$  with the positive direction of y-axis measured anticlockwise.

**Solution:** Direction vector of y-axis is  $\mathbf{y} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$  and direction vector of line is  $\mathbf{l} = \begin{pmatrix} 1 \\ m \end{pmatrix}$ .

$$\cos(30^\circ) = \frac{\mathbf{l}^T \mathbf{y}}{\|\mathbf{l}\| \|\mathbf{y}\|} = \frac{m}{\sqrt{1+m^2}} \quad (1)$$

$$\frac{m}{\sqrt{1+m^2}} = \frac{\sqrt{3}}{2} \quad (2)$$

$$m = \pm \sqrt{3} \quad (3)$$

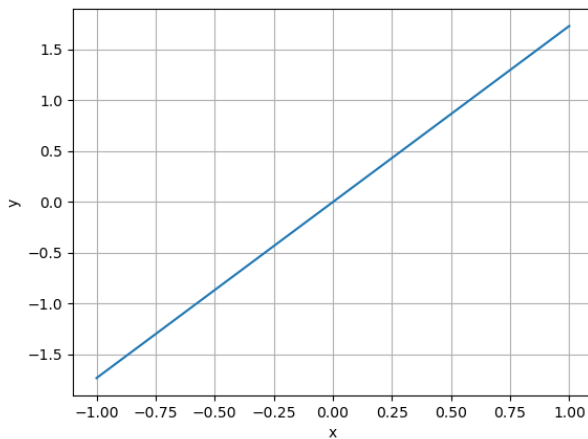


Fig. 1: Line with slope  $m = \sqrt{3}$