LaTeX 11.10.1.7

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Class 11, Exercse 10.1

7) Find the slope of the line, which makes an angle of 30° 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 $\mathbf{l} = \begin{pmatrix} 1 \\ m \end{pmatrix}$.

$$\begin{aligned} cos(30°) &= \frac{\mathbf{l}^T\mathbf{y}}{|\mathbf{l}||\mathbf{y}|} \\ &= \frac{m}{\sqrt{1+m^2}} \\ \frac{m}{\sqrt{1+m^2}} &= \frac{\sqrt{3}}{2} \\ m &= \pm\sqrt{3} \end{aligned}$$