

Solution of Practice Exercise 4

Q1. Find the slopes of the sides of the triangle with vertices $(-1, 3)$, $(5, 4)$ and $(2, 8)$.

Solution: Let $A(-1,3)$, $B(5,4)$ and $C(2,8)$ be the given points, then

$$\text{Slope of side AB} = \frac{4-3}{5+1} = \frac{1}{6}$$

$$\text{Slope of side BC} = \frac{8-4}{2-5} = \frac{-4}{3}$$

$$\text{Slope of side CA} = \frac{3-8}{-1-2} = \frac{5}{3}$$

Q2. Find equation of the line passing through the point $(1,2)$ and having slope 3.

Solution:

Point-slope form of the line passing through $P(x_1, y_1)$ and having slope m is given by the equation:

$$y - y_1 = m(x - x_1)$$

$$\Rightarrow y - 2 = 3(x - 1)$$

$$\Rightarrow y - 2 = 3x - 3$$

$$\Rightarrow y = 3x - 1$$

Q3. Find the slope-intercept form of the equation of the line that passes through the point $(5, -3)$ and perpendicular to line $y = 2x + 1$.

Solution:

The slope-intercept form of the line with y -intercept b and slope m is given by the equation: $y = mx + b$

The given line has slope 2, so the line to be determined will have slope $m = -\frac{1}{2}$.

Substituting this slope and the given point in the point-slope form: $y - y_1 = m(x - x_1)$, yields

$$y - (-3) = -\frac{1}{2}(x - 5)$$

$$\Rightarrow y + 3 = -\frac{1}{2}(x - 5)$$

$$\Rightarrow y = -\frac{1}{2}x + \frac{5}{2} - 3 \Rightarrow y = -\frac{1}{2}x - \frac{1}{2}$$

- Q4. Find the slope and angle of inclination of the line joining the points (2, 3) and (-1, 2).

Solution: If m is the slope of line joining the points (2, 3) and (-1, 2) then

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 3}{-1 - 2} = \frac{1}{3} \text{ is the slope}$$

Now angle of inclination is:

$$\tan \theta = m$$

$$\tan \theta = \frac{1}{3}$$

$$\theta = \tan^{-1}\left(\frac{1}{3}\right) = 18.43^\circ$$

- Q5. By means of slopes, Show that the points lie on the same line

A (-3, 4); B (3, 2); C (6, 1)

$$\text{Solution: Slope of line through A(-3, 4); B(3, 2)} = \frac{2 - 4}{3 - (-3)} = \frac{-2}{6} = -\frac{1}{3}$$

$$\text{Slope of line through B(3, 2); C(6, 1)} = \frac{1 - 2}{6 - 3} = -\frac{1}{3}$$

$$\text{Slope of line through C(6, 1); A(-3, 4)} = \frac{4 - 1}{-3 - 6} = -\frac{3}{9} = -\frac{1}{3}$$

Since all slopes are same, so the given points lie on the same line.
