

Sample Questions

Question 1 :

Determine the equation of the straight line whose slope is 2 and y-intercept is 9.

Solution :

$$y = mx + c$$

Here $m = 2, c = 9$

$$y = 2x + 9$$

Question 2 :

Determine the equation of the straight line whose slope is 3 and x-intercept is 3.

Solution :

$$y = m(x - d)$$

Here $m = 3, d = 3$

$$y = 3 \times (x - 3)$$

$$y = 3x - 9$$

$$\underline{3x - y - 9 = 0}$$

Question 3 :

Intersecting the x axis at a distance of 4 units to the left of origin with slope -5

Solution :

$$y = m(x - d)$$

Here $m = -5, d = -4$

$$y = -5 \times (x + 4)$$

$$y = -5x + 20$$

$$\underline{5x + y - 20 = 0}$$

Question 4 :

Determine the equation of the straight line passing through $(-1, 2)$ and having slope $\frac{2}{7}$

Solution :

The point-slope form is

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

Here $(x_1, y_1) = (-1, 2)$ and $m = \frac{2}{7}$

$$\therefore y - 2 = \frac{2}{7}(x + 1)$$

$$7y - 14 = 2x + 2$$

$$2x - 7y + 16 = 0$$

Question 5 :

Determine the equation of the straight line passing through the points (1, 2) and (3, - 4).

Solution :

The equation of a straight line passing through two points is

$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

Here $(x_1, y_1) = (1, 2)$ and $(x_2, y_2) = (3, - 4)$

$$\therefore \frac{y - 2}{-4 - 2} = \frac{x - 1}{3 - 1}$$

$$\frac{y - 2}{-6} = \frac{x - 1}{-2}$$

$$2(y - 2) = 6(x - 1)$$

$$\underline{\underline{3x + y = 5}}$$

Question 6 :

Find slope of the straight line passing through the points (-3, 2) and (3, 4).

Solution :

$$\begin{aligned}\text{Slope } m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{4 - 2}{3 - (-3)} = \frac{2}{6} \\ &= \underline{\underline{\frac{1}{3}}}\end{aligned}$$

Question 7 :

Find the length of the perpendicular from (2, -3) to the line $2x - y + 9 = 0$

Solution :

Perpendicular distance :

$$\begin{aligned}d &= \left| \frac{Ax_1 + By_2 + C}{\sqrt{A^2 + B^2}} \right| \\&= \left| \frac{2(2) - (-3) + 9}{\sqrt{(2)^2 + (-1)^2}} \right| \\&= \frac{16}{\sqrt{5}} \text{ units}\end{aligned}$$

Question 8 :

Find the equation of the straight line, if the perpendicular from the origin makes an angle of 120° with x-axis and the length of the perpendicular from the origin is 6 units.

Solution :

$$x \cos \omega + y \sin \omega = p$$

Here $\omega = 120^\circ$; $p = 6$

$$\begin{aligned}\therefore x \left(\frac{-1}{2} \right) + y \left(\frac{\sqrt{3}}{2} \right) &= 6 \\x - \sqrt{3} y + 12 &= 0\end{aligned}$$

Question 9 :

Show that the straight lines $2x + y - 9 = 0$ and $2x + y - 10 = 0$ are parallel.

Solution :

Slope of the straight line $2x + y - 9 = 0$ is $m_1 = -2$

Slope of the straight line $2x + y - 10 = 0$ is $m_2 = -2$

$$\therefore m_1 = m_2$$

\therefore Lines are parallel

Question 10 :

Show that the two straight lines whose equations are $x + 2y + 5 = 0$ and $2x + 4y - 5 = 0$ are parallel.

Solution :

The two given equations are

$$x + 2y + 5 = 0$$

$$2x + 4y - 5 = 0$$

The coefficients of x and y are proportional and therefore they are parallel.

Question 11 :

Find the distance between the parallel lines $2x + 3y - 6 = 0$ and $2x + 3y + 7 = 0$.

Solution :

The distance between the parallel lines is

$$d = \left| \frac{C_1 - C_2}{\sqrt{A^2 + B^2}} \right|$$

Here $C_1 = -6$, $C_2 = 7$, $A = 2$, $B = 3$

The required distance is $\left| \frac{-6 - 7}{\sqrt{2^2 + 3^2}} \right| = \sqrt{13}$

EXERCISE

1.

- a) The Which one of the following pair of straight lines are parallel?

$$x - 2y - 4 = 0; 2x - 3y - 4 = 0$$

$$x - 2y - 4 = 0; x - 2y - 5 = 0$$

$$2x - 2y - 8 = 0; 3x - 3y - 8 = 0$$

$$2x - 3y - 8 = 0; 3x - 2y - 8 = 0$$

- b) Equation of a straight line is $3x - 4y + 10 = 0$. Convert it into the intercept form and write the x -intercept and y -intercept.

- c) Find the equation of the Line perpendicular to the line $x - 7y + 5 = 0$ and having x - intercept 3.

(March 2016)

2.

- a) Slope of a line making an angle 135° with the positive direction of the x- axis is
- b) Find the equation of the line l_1 perpendicular to l_2 and passing through the point (2,3).
- c) Find the equation of line passing through the intersection of $4x - y + 7 = 0$ and which is parallel to $5x + 4y - 20 = 0$

OR

(Imp 2015)

3.

- a) Slope of the line $2x + 3y + 5 = 0$ is...
- b) Find the equation of the line L parallel to L' and passing through (2,2).
- c) Find the distance of the lines L and L' from the origin. Also find the distance between the lines L and L' .

(Imp 2015)

4.

- a) Find the equation of the line passing through the points (3, -2) and (-1,4).
- b) Reduce the equation $\sqrt{3}x + y - 8 = 0$ into normal form.
- c) If the angle between two lines is $\frac{\pi}{4}$ and slope of one of the lines is $\frac{1}{2}$, find the slope of the other line.

(March 2015)