

### Exercise 26(C)

#### Solution 1:

The angle which a straight line makes with the positive direction of x-axis (measured in anticlockwise direction) is called inclination of the line.

The inclination of a line is usually denoted by  $\theta$

- (i) The inclination is  $\theta = 45^\circ$
- (ii) The inclination is  $\theta = 135^\circ$
- (iii) The inclination is  $\theta = 30^\circ$

#### Solution 2:

- (i) The inclination of a line parallel to x-axis is  $\theta = 0^\circ$
- (ii) The inclination of a line perpendicular to x-axis is  $\theta = 90^\circ$
- (iii) The inclination of a line parallel to y-axis is  $\theta = 90^\circ$
- (iv) The inclination of a line perpendicular to y-axis is  $\theta = 0^\circ$

#### Solution 3:

If  $\theta$  is the inclination of a line; the slope of the line is  $\tan \theta$  and is usually denoted by letter  $m$ .

(i) Here the inclination of a line is  $0^\circ$ , then  $\theta = 0^\circ$

Therefore the slope of the line is  $m = \tan 0^\circ = 0$

(ii) Here the inclination of a line is  $30^\circ$ , then  $\theta = 30^\circ$

Therefore the slope of the line is  $m = \tan \theta = 30^\circ = \frac{1}{\sqrt{3}}$

(iii) Here the inclination of a line is  $45^\circ$ , then  $\theta = 45^\circ$

Therefore the slope of the line is  $m = \tan 45^\circ = 1$

(iv) Here the inclination of a line is  $60^\circ$ , then  $\theta = 60^\circ$

Therefore the slope of the line is  $m = \tan 60^\circ = \sqrt{3}$

#### Solution 4:

If  $\tan \theta$  is the slope of a line; then inclination of the line is  $\tan \theta$

(i) Here the slope of line is 0; then  $\tan \theta = 0$

Now

$$\tan \theta = 0$$

$$\tan \theta = \tan 0^\circ$$

$$\theta = 0^\circ$$

Therefore the inclination of the given line is  $\theta = 0^\circ$

(ii) Here the slope of line is 1; then  $\tan \theta = 1$

Now

$$\tan \theta = 1$$

$$\tan \theta = \tan 45^\circ$$

$$\theta = 45^\circ$$

Now

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

$$\tan \theta = \tan 30^\circ$$

$$\theta = 30^\circ$$

Therefore the inclination of the given line is  $\theta = 30^\circ$

$$\tan \theta = \tan 60^\circ$$

$$\theta = 60^\circ$$

Therefore the inclination of the given line is  $\theta = 60^\circ$

(iv) Here the slope of line is  $\frac{1}{\sqrt{3}}$ ; then  $\tan \theta = \frac{1}{\sqrt{3}}$



**Solution 5:**

(i) For any line which is parallel to x-axis, the inclination is  $\theta = 0^\circ$

Therefore, Slope(m) =  $\tan \theta = \tan 0^\circ = 0$

(ii) For any line which is perpendicular to x-axis, the inclination is  $\theta = 90^\circ$

Therefore, Slope(m) =  $\tan \theta = \tan 90^\circ = \infty$  (not defined)

(iii) For any line which is parallel to y-axis, the inclination is  $\theta = 90^\circ$

Therefore, Slope(m) =  $\tan \theta = \tan 90^\circ = \infty$  (not defined)

(iv) For any line which is perpendicular to y-axis, the inclination is  $\theta = 0^\circ$

Therefore, Slope(m) =  $\tan \theta = \tan 0^\circ = 0$

**Solution 6:**

Equation of any straight line in the form  $y = mx + c$ , where slope = m (co-efficient of x) and

y-intercept = c (constant term)

(i)  $x + 3y + 5 = 0$

$$x + 3y + 5 = 0$$

$$3y = -x - 5$$

$$y = \frac{-x - 5}{3}$$

$$y = \frac{-1}{3}x + \left(-\frac{5}{3}\right)$$

Therefore,

$$\text{slope} = \text{co-efficient of } x = -\frac{1}{3}$$

$$\text{y-intercept} = \text{constant term} = -\frac{5}{3}$$

(ii)  $3x - y - 8 = 0$

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

$$-y = -3x + 8$$

$$y = 3x + (-8)$$

Therefore,

$$\text{slope} = \text{co-efficient of } x = 3$$

$$\text{y-intercept} = \text{constant term} = -8$$

(iii)  $5x = 4y + 7$

$$5x = 4y + 7$$

$$4y = 5x - 7$$

$$y = \frac{5x - 7}{4}$$

$$y = \frac{5}{4}x + \left(-\frac{7}{4}\right)$$

Therefore,

$$\text{slope} = \text{co-efficient of } x = \frac{5}{4}$$

$$\text{y-intercept} = \text{constant term} = -\frac{7}{4}$$

$$(iv) \ x = 5y - 4$$

$$x = 5y - 4$$

$$5y = x + 4$$

$$y = \frac{x + 4}{5}$$

$$y = \frac{1}{5}x + \frac{4}{5}$$

Therefore,

$$\text{slope} = \text{co-efficient of } x = \frac{1}{5}$$

$$\text{y-intercept} = \text{constant term} = \frac{4}{5}$$

$$(v) \ y = 7x - 2$$

$$y = 7x - 2$$

$$y = 7x + (-2)$$

Therefore,

$$\text{slope} = \text{co-efficient of } x = 7$$

$$\text{y-intercept} = \text{constant term} = -2$$

$$(vi) \ 3y = 7$$

$$3y = 7$$

$$3y = 0 \cdot x + 7$$

$$y = \frac{0}{3}x + \frac{7}{3}$$

$$y = 0 \cdot x + \frac{7}{3}$$

Therefore,

$$\text{slope} = \text{co-efficient of } x = 0$$

$$\text{y-intercept} = \text{constant term} = \frac{7}{3}$$

$$(vii) \ 4y + 9 = 0$$

$$4y + 9 = 0$$

$$4y = 0 \cdot x - 9$$

$$y = \frac{0}{4}x - \frac{9}{4}$$

$$y = 0 \cdot x + \left(-\frac{9}{4}\right)$$

Therefore,

$$\text{slope} = \text{co-efficient of } x = 0$$

$$\text{y-intercept} = \text{constant term} = -\frac{9}{4}$$

**Solution 7:**

(i) Given

Slope is 2, therefore  $m = 2$

Y-intercept is 3, therefore  $c = 3$

Therefore,

$$y = mx + c$$

$$y = 2x + 3$$

Therefore the equation of the required line is  $y = 2x + 3$

(ii) Given

Slope is 5, therefore  $m = 5$

Y-intercept is -8, therefore  $c = -8$

Therefore,

$$y = mx + c$$

$$y = 5x - 8$$

Therefore the equation of the required line is  $y = 5x - 8$

(iii) Given

Slope is -4, therefore  $m = -4$

Y-intercept is 2, therefore  $c = 2$

Therefore,

$$y = mx + c$$

$$y = -4x + 2$$

Therefore the equation of the required line is  $y = -4x + 2$

(iv) Given

Slope is -3, therefore  $m = -3$

Y-intercept is -1, therefore  $c = -1$

Therefore,

$$y = mx + c$$

$$y = -3x - 1$$

Therefore the equation of the required line is  $y = -3x - 1$

(v) Given

Slope is 0, therefore  $m = 0$

Y-intercept is -5, therefore  $c = -5$

Therefore,

$$y = mx + c$$

$$y = 0 \cdot x + (-5)$$

$$y = -5$$

Therefore the equation of the required line is  $y = -5$

(vi) Given

Slope is 0, therefore  $m = 0$

Y-intercept is 0, therefore  $c = 0$

Therefore,

$$y = mx + c$$

$$y = 0 \cdot x + 0$$

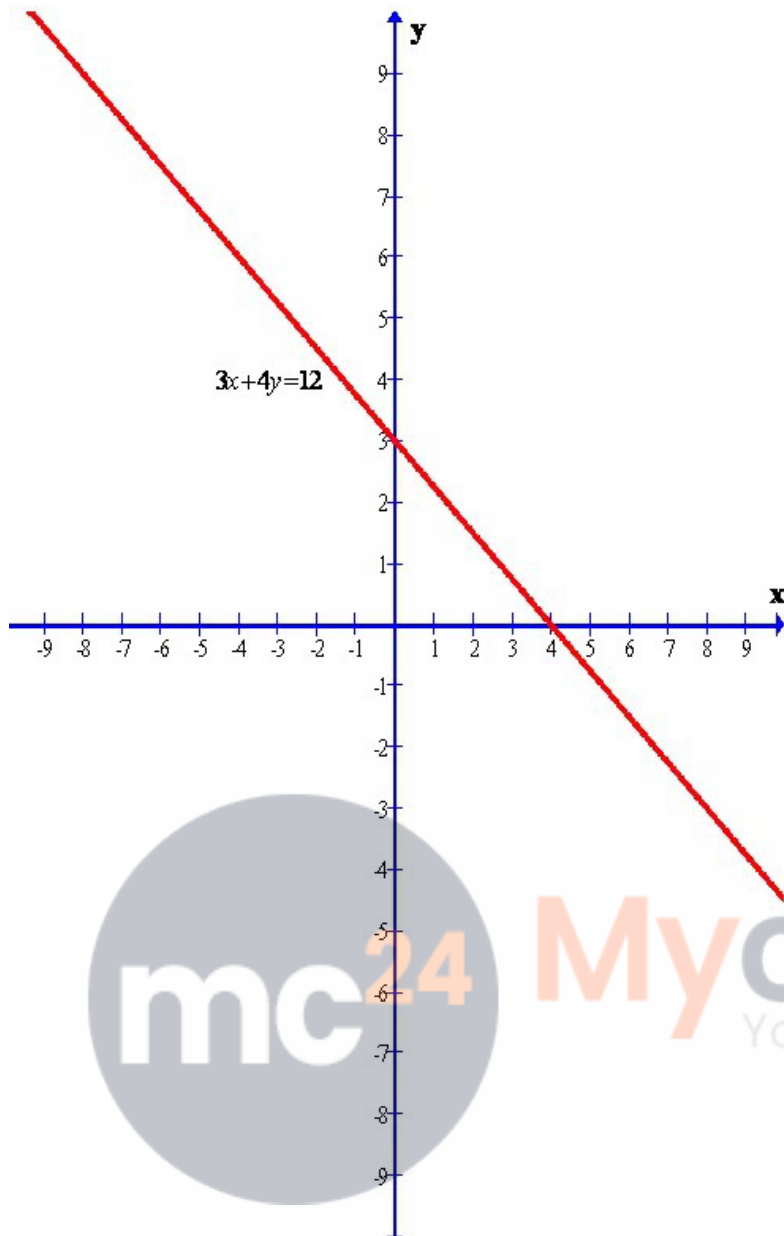
$$y = 0$$

Therefore the equation of the required line is  $y = 0$

**Solution 8:**

Given line is  $3x + 4y = 12$

The graph of the given line is shown below.



Clearly from the graph we can find the y-intercept.

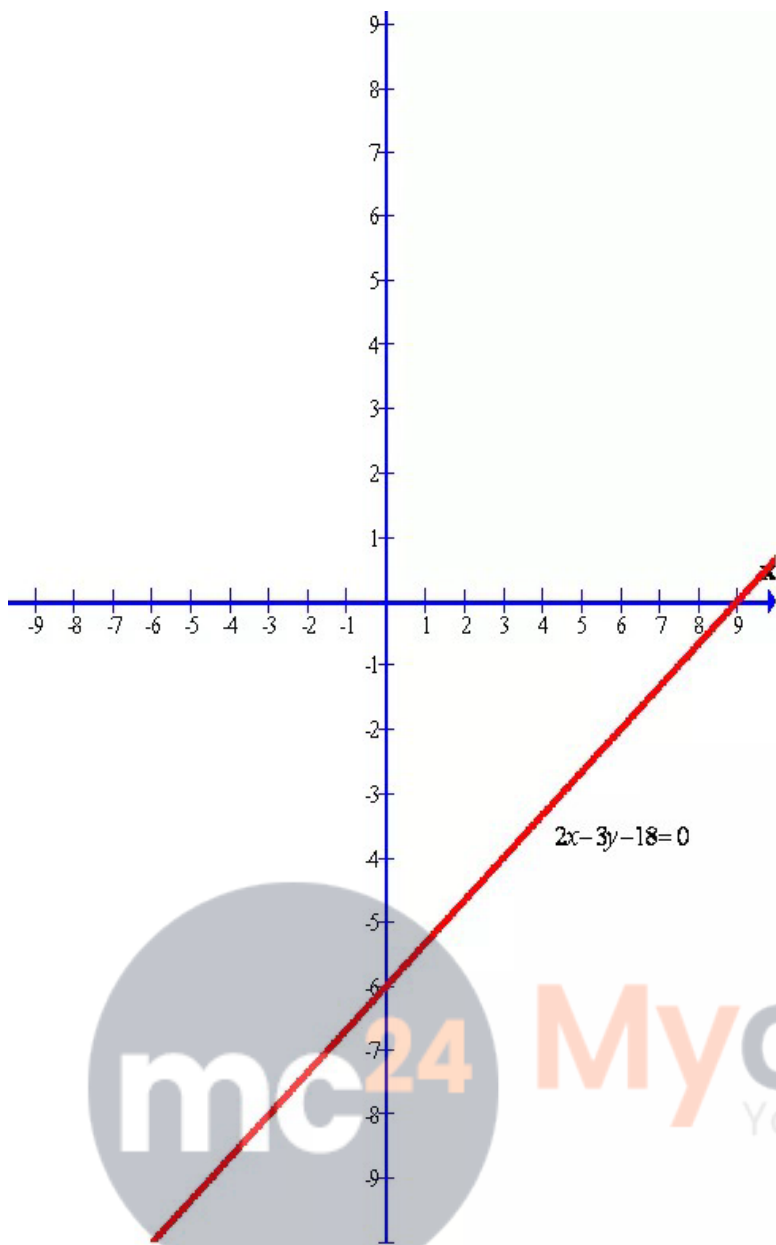
The required y-intercept is 3.

**Solution 9:**

Given line is

$$2x - 3y - 18 = 0$$

The graph of the given line is shown below.



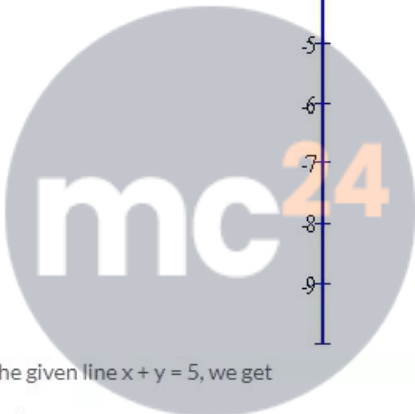
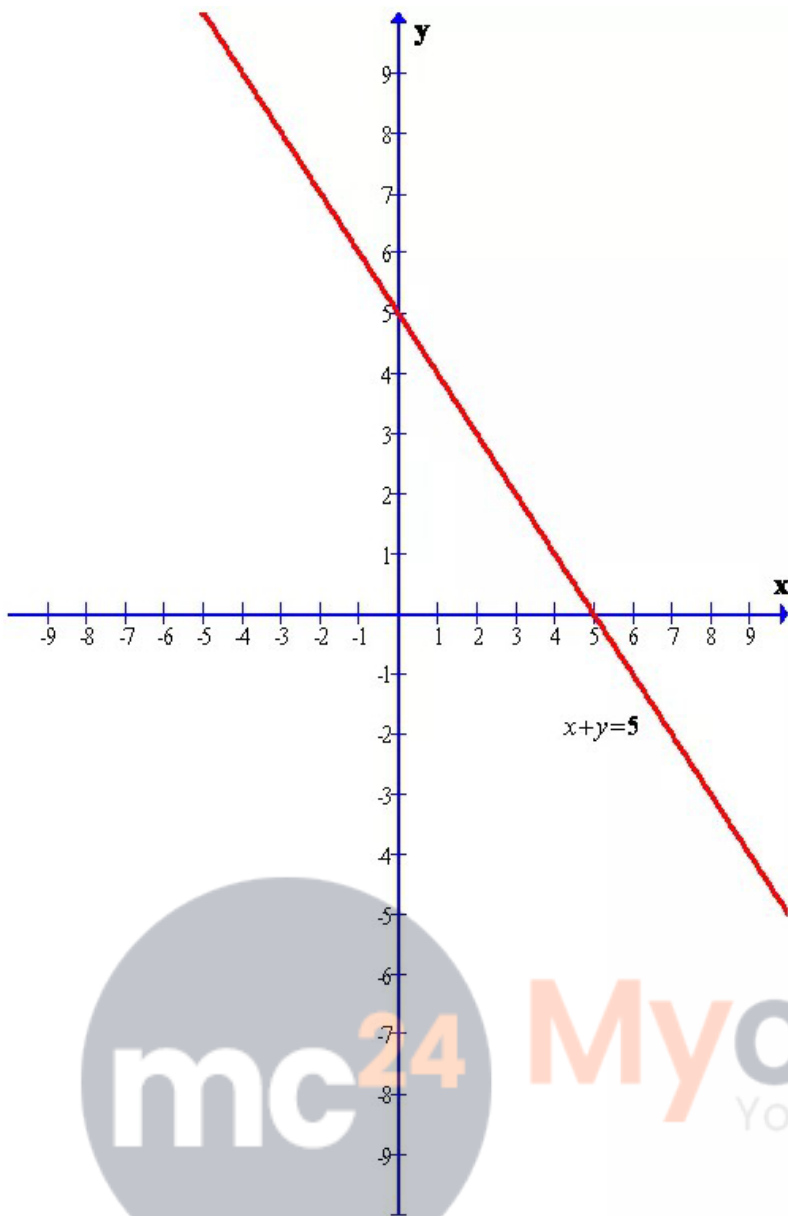
Clearly from the graph we can find the y-intercept.  
The required y-intercept is -6

**Solution 10:**

Given line is

$$x + y = 5$$

The graph of the given line is shown below.



**Myclass24**  
Your Class. Your Pace.

From the given line  $x + y = 5$ , we get

$$x + y = 5$$

$$y = -x + 5$$

$$y = (-1) \cdot x + 5 \dots\dots (A)$$

Again we know that equation of any straight line in the form  $y = mx + c$ , where  $m$  is the gradient and  $c$  is the intercept. Again we have if slope of a line is  $\tan \theta$  then inclination of the line is  $\theta$

Now from the equation (A), we have

$$m = -1$$

$$\tan \theta = -1$$

$$\tan \theta = \tan 135^\circ$$

$$\theta = 135^\circ$$

And  $c = 5$

Therefore the required inclination is  $\theta = 135^\circ$  and y-intercept is  $c = 5$