CHAPTER **3**

Coordinate Geometry

EXERCISE 3

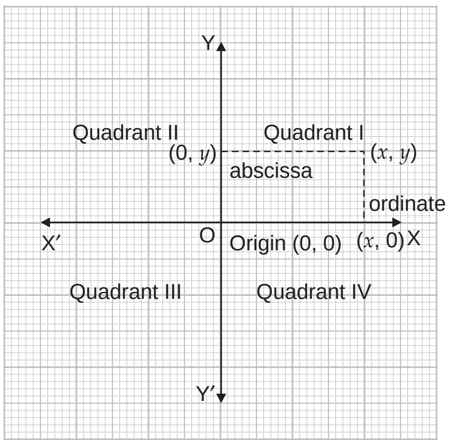
1. (*i*) The coordinate axes divide the Cartesian plane into four parts known as the **quadrants.**

(*ii*) The point of intersection of the coordinate axes is called the **origin**.

(*iii*) The coordinates of the origin are **(0, 0).**

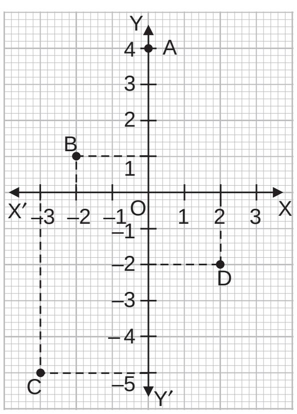
(*iv*) The distance of a point from y-axis is its ***x*-coordinate or abscissa** and the distance of a point from x-axis is its ***y*-coordinate or ordinate**.

(*v*) The y-coordinate of every point on the x-axis is **zero** and the x-coordinate of every point on the y-axis is **zero.**

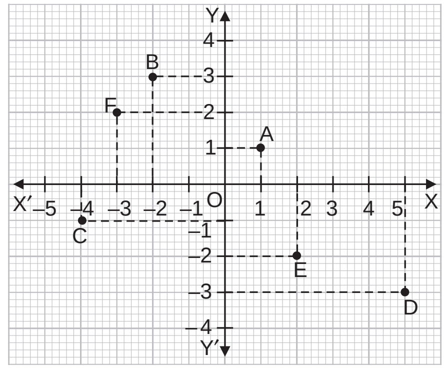


2.

Point	*Abscissa*	*Ordinate*	*Coordinate*
A	0	4	(0, 4)
B	–2	1	(–2, 1)
C	–3	–5	(–3, –5)
D	2	–2	(2, –2)



3.



(*i*) The coordinates of A are **(1, 1)**.

(*ii*) The abscissa of point B is **–2**.

(*iii*) The coordinates of C are **(–4, –1)**.

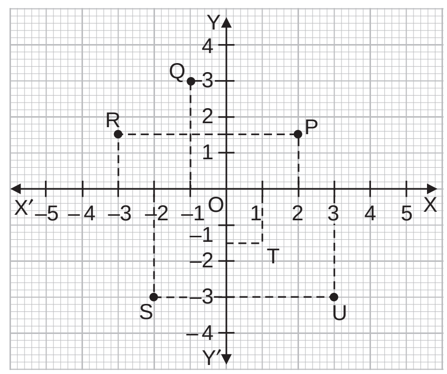
(*iv*) The ordinate of D is **–3**.

(*v*) The point identified by (2, –2) is **E**.

(*vi*) The point identified by (–3, 2) is **F**.

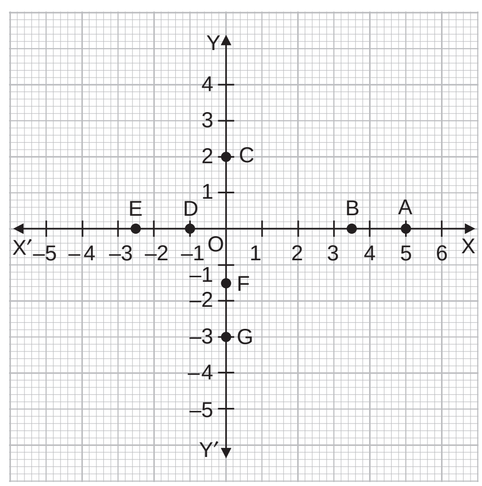
4. Coordinates of points P, Q R, S, T and U are

P **(2, 1.5)**
Q **(–1, 3)**
R **(–3, 1.5)**
S **(–2, –3)**
T **(1, –1.5)**
U **(3, –3)**



5. Coordinates of points A, B, C, D, E, F and G are

A **(5, 0)**
B **(3.5, 0)**
C **(0, 2)**
D **(–1, 0)**
E **(–2.5, 0)**
F **(0, –1.5)**
G **(0, –3)**



6. The following points lie on the x-axis because their y-coordinate (ordinate) is zero.

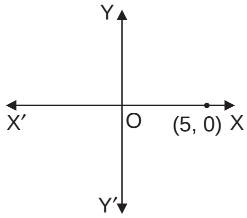
C (–3, 0), F (6, 0), G (3, 0)

The following points lie on the y-axis because their x-coordinate (abscissa) is zero.

A (0, 2), D(0, –3), E(0, 4)

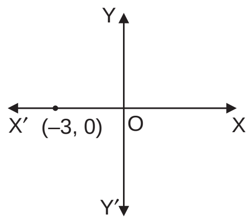
7. (*i*) Coordinates of a point which lies on the x-axis at a distance of 5 units to the right of origin are **(5, 0)**

∵ its abscissa is 5 and ordinate is 0.



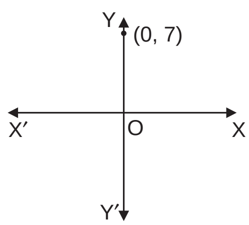
(*ii*) Coordinates of a point which lies on the x-axis at a distance of 3 units to the left of the origin are **(–3, 0)**

∵ its abscissa is –3 and ordinate is 0.



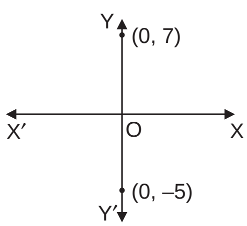
(*iii*) Coordinates of a point which lies on the y-axis at a distance of 7 units above the origin are **(0, 7)**

∵ its abscissa is 0 and ordinate is 7.



(*iv*) Coordinates of a point which lies on the y-axis at a distance of 5 units below the origin are **(0, –5)**

∵ its abscissa is 0 and ordinate is –5.



8. (*i*) (2, 3) lies in the **first quadrant**

∵ its abscissa and ordinate both are positive.

(*ii*) (5, –8) lies in the **fourth quadrant**

∵ its abscissa is positive and ordinate is negative.

(*iii*) (–3, –1.5) lies in the **third quadrant**

∵ its abscissa and ordinate both are negative.

(*iv*) (–3, 8.5) lies in the **second quadrant**

∵ its abscissa is negative and ordinate is positive.

9. (*i*) The point will lie in the **second quadrant**

∵ its abscissa is negative and ordinate is positive.

(*ii*) The point will lie in the **third quadrant**

∵ its abscissa and ordinate both are negative.

(*iii*) the point will lie in the **first quadrant**

∵ its abscissa and ordinate both are positive.

(*iv*) the point will lie in the **second quadrant**

∵ abscissa is negative and ordinate is positive.

10. P (x, y) which has

(*i*) $x > 0$ and $y < 0$ implies that the abscissa of this point P is positive and its ordinate is negative. So it lies in the **fourth quadrant.**

(*ii*) $x < 0$ and $y > 0$ implies that the abscissa of this point P is negative and its ordinate is positive. So it lies in the **second quadrant.**

11. The points which lie on the x-axis, y-axis and the origin do not belong to an quadrant.

12. (*i*) The abscissa and ordinates of point (0, 3) are 0 and 3 respectively. Since its x-coordinate (abscissa) is

∴ It lies on the y-axis.

(*ii*) The abscissa and ordinates of point (3, 4.5) are 3 and 4.5 respectively. Since its abscissa and ordinate both are positive ∴ it lies in the **first quadrant.**

(*iii*) The abscissa and ordinate of point (0, –2) are 0 and –2 respectively. Since its x-coordinate (abscissa) is 0

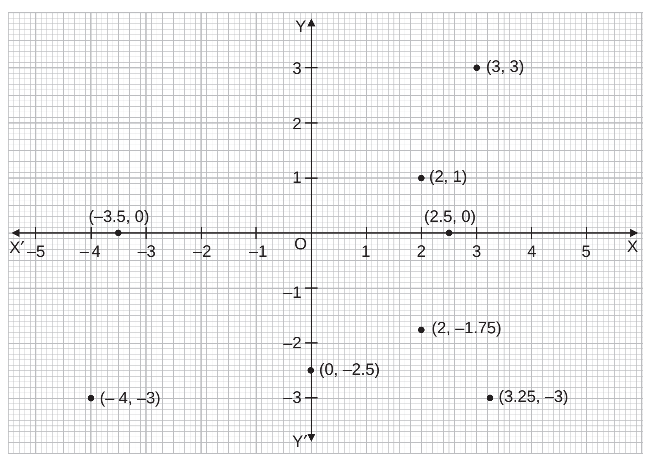
∴ it lies on the ***y*-axis**

(*iv*) The abscissa and ordinate of point (5.5, 0) are 5.5 and 0 respectively. Since its y-coordinate (ordinate) is 0, ∴ it lies on the ***x*-axis**.

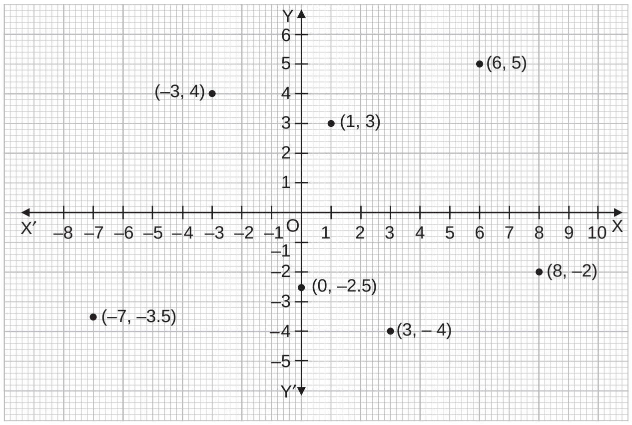
13. The value of the ordinate (y-coordinate) for every point on the x-axis is **zero.**

14. The value of the abscissa (x-coordinate) for every point on the y-axis is **zero.**

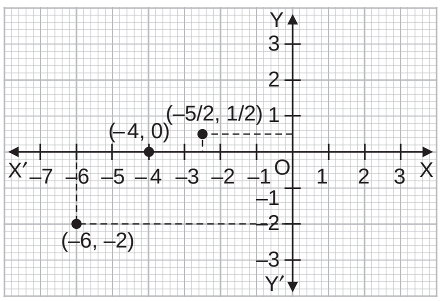
15. Positions of the points are shown by dots in the figure given below:



16. Positions of the points are shown by dots in the figure given below:



17. Positions of the points are shown by the dots in the figure given below.



(*i*) Point (–6, –2) lies in the **third quadrant** as its x-coordinate (abscissa) and y coordinate (ordinate) both are negative.

(*ii*) Point (–4, 0) does not lie in any quadrant but it lies on the ***x*-axis** as its y coordinate (ordinate) is zero.

(*iii*) Point $\left(\frac{-5}{2}, \frac{1}{2}\right)$ lies in the **second quadrant** as its x-coordinate (abscissa) is negative and y-coordinate (ordinate) is positive.

18.

$$3x + 2y - 12 = 0$$

$$3x + 2y = 12$$

$$\Rightarrow \quad 2y = 12 - 3x$$

$$\Rightarrow \quad y = \frac{12 - 3x}{2}$$

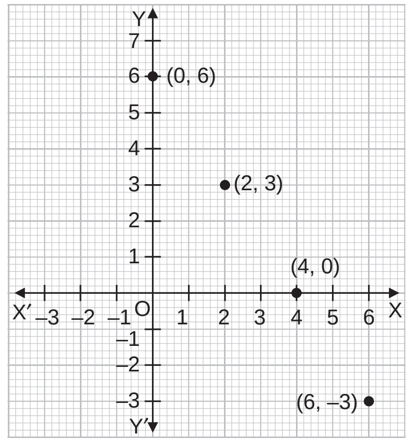
$$\therefore \quad x = 0 \quad \Rightarrow \quad y = \frac{12 - 3(0)}{2} = 6$$

$$\therefore \quad x = 2 \quad \Rightarrow \quad y = \frac{12 - 3(2)}{2} = 3$$

$$\therefore \quad x = 4 \quad \Rightarrow \quad y = \frac{12 - 3(4)}{2} = 0$$

$$\therefore \quad x = 6 \quad \text{and} \quad y = \frac{12 - 3(6)}{2} = -3$$

So, some of the ordered pairs are (0, 6), (2, 3), (4, 0), (6, 3). Their positions are shown by dots in the given figure.
∴ x can take infinite number of values and each value of x will have a corresponding value of y which will satisfy the given equation.



∴ Infinite number of ordered pairs satisfying the given equation can be found and plotted.

CHECK YOUR UNDERSTANDING

MULTIPLE-CHOICE QUESTIONS

1. (*c*) **90º**
Since, the coordinate axes are mutually perpendicular therefore the angle between them is a right angle.

2. (*c*) **on the *y*-axis**
Since, the x-coordinates of the points (0, 3) and (0, –7) are zero ∴ They both lie on the y-axis.

3. (*d*) **on the negative direction of *x*-axis**
Since the x-coordinate of (–3, 0) is negative and its y-coordinate is zero.
∴ It lies on the negative direction of x-axis (i.e to the left of the origin on the x-axis)

4. (*b*) **on the *x*-axis**
Every point whose ordinate (y-coordinate) is zero, lies on the x-axis.

5. (*a*) –, –
For any point P (x, y) in the third quadrant, $x < 0$ and $y < 0$.

6. **first quadrant**
For any point P (x, y) in the first quadrant, $x > 0$ and $y > 0$.

7. (*b*) **fourth and second quadrants respectively.**
Point (2, –3) has abscissa and ordinate equal to 2 and –3 respectively. Since its abscissa is positive and ordinate is negative, i.e. $x > 0$ and $y < 0$, therefore it lies in the fourth quadrant.
Point (–3, 2) has abscissa and ordinate equal to –3 and 2 respectively. Since its abscissa is negative and ordinate is positive, i.e $x < 0$ and $y > 0$ therefore it lies in the second quadrant.

8. (*c*) **Q and R**
For each point in the fourth quadrant abscissa is positive and ordinate is negative, i.e. $x > 0$ and $y < 0$.
∴ Q (3, –5) and R (2, –2) will be in the fourth quadrant.

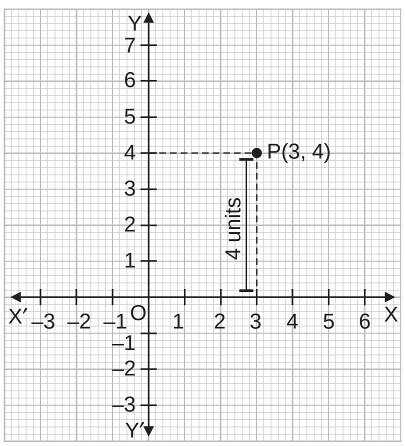
9. (*a*) **first and second quadrants**
Each point (x, y) in the first quadrant has $x > 0, y > 0$
Each point (x, y) in the second quadrant has $x < 0, y > 0$
Each point (x, y) in the third quadrant has $x < 0, y < 0$
and each point (x, y) in the fourth quadrant has $x > 0$, $y < 0$.
This, we see that ordinate (y-coordinate) is positive in the first and second quadrants.

10. (*b*) **second quadrant**
A point with abscissa –3 and ordinate has negative abscissa and positive ordinate, i.e. $x < 0, y > 0$, so it will be in the second quadrant.

11. (*a*) (0, 0)
Origin is the point of intersection of the coordinate-axes and its x-coordinate and y coordinate both are equal to zero.

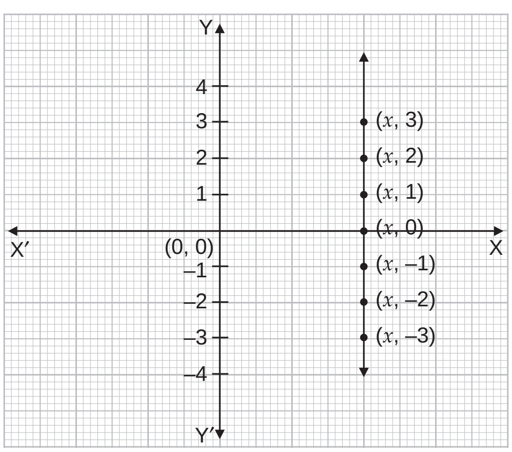
12. (*c*) **(0, –8)**
Since the point lies on the y-axis, its x-coordinate (abscissa) is 0.
Also the given point is 8 units away from the x-axis and lies on the negative direction of the y-axis (below the origin), so its y-coordinate (ordinate) is –8.
Hence, the coordinates of the point are (0, –8).

13. (*b*) **4 units**



The perpendicular distance of point P (3, 4) from the x-axis is equal to the y-coordinate (ordinate) of point P, i.e. units.

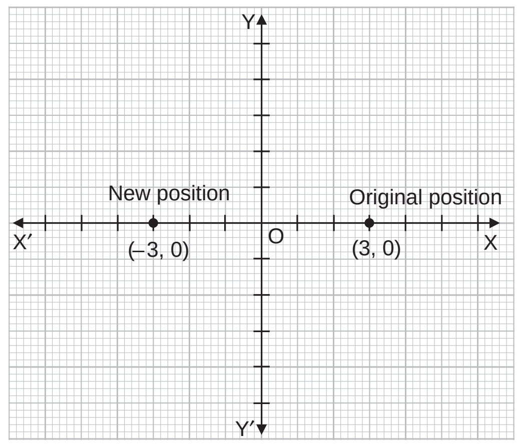
14. (*c*) ***y*-axis**



Two points have abscissa (x-coordinates) will be equidistant from the y-axis. If their ordinates (y-coordinates) are different, then their distance from the x-axis will not be same. Hence, a line joining them will be parallel to the y-axis.

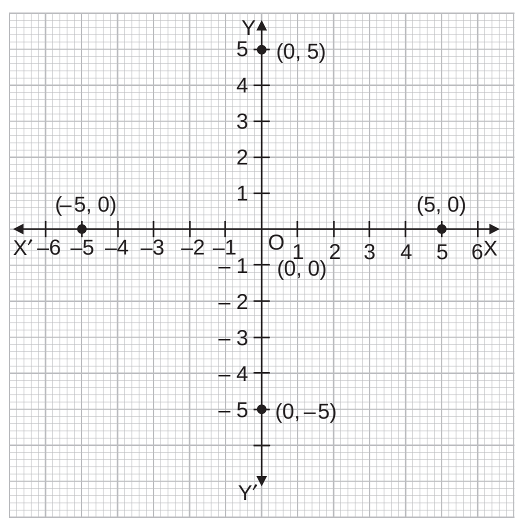
15. (*b*) **first or third quadrants**
Each point in the first quadrant has both abscissa and ordinates of the same sign, i.e. positive. ($\because x > 0, y > 0$).
Each point in the third quadrant has both abscissa and ordinates of the same sign, i.e. negative ($\because x < 0, y < 0$) whereas, any point in the second quadrant has negative abscissa and positive ordinate ($\because x < 0, y > 0$) and any point in the fourth quadrant has positive abscissa and negative ordinate. ($\because x > 0, y < 0$)

16. (*c*) **(–3, 0)**



Original position of the point was (3, 0) It is made to slide along the x-axis, so its ordinate remains 0.
Since its new position is on the negative direction of x-axis (left of origin), at the same distance of 3 units from the y-axis, therefore its abscissa (x-coordinate) is –3.
Hence, the coordinates of the point in its new position are (–3, 0).

17. (*a*) **(5, 0), (0, 5), (–5, 0), (0, –5)**



The given figure shows four points lying on the coordinate axes at a distance of 5 units from the origin.

18. (*d*) $y - x = 1$

The difference of ordinate and abscissa is 1.

$\Rightarrow$ The difference of y-coordinate and x-coordinate is 1.

$\therefore$ $y - x = 1$.

19. (*c*) **(0, –2)**

Any point lying on the y-axis will have x-coordinate equal to 0.

Since, the point lying on the y-axis satisfies the equation $2x - 5y = 10$

$\therefore \quad 2(0) - 5y = 10$

$\Rightarrow \quad y = -2$

So, the coordinates of the point lying on y-axis satisfying the given equation are (0, –2).

20. (*b*) **(3, 0)**

The y-coordinate of the point where the line cuts the x-axis will be 0.

Putting $y = 0$ in the given equation, we get

$5x + 3(0) = 15$

$\Rightarrow \quad 5x = 15$

$\Rightarrow \quad x = 3$

So the graph line of equation $5x + 3y = 15$, will intersect the x-axis at (3, 0)

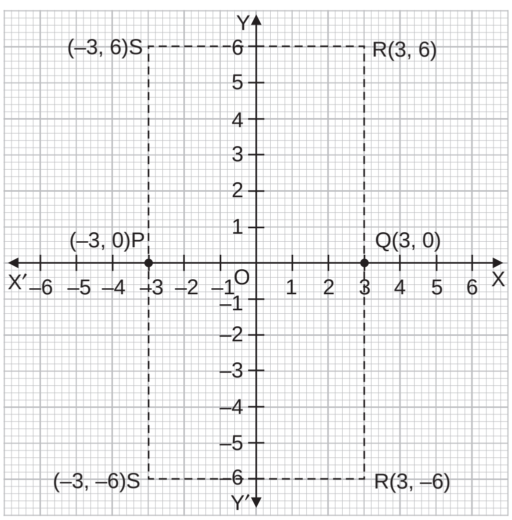
SHORT ANSWER QUESTIONS

1. Two answers are possible

R (3, 6), S(–3, 6)

Or

R (3, –6), S (–3, –6)



PQRS is a square in both the cases with each side equal to 6 units.

2. Draw BM ⊥ x-axis intersecting AC at N

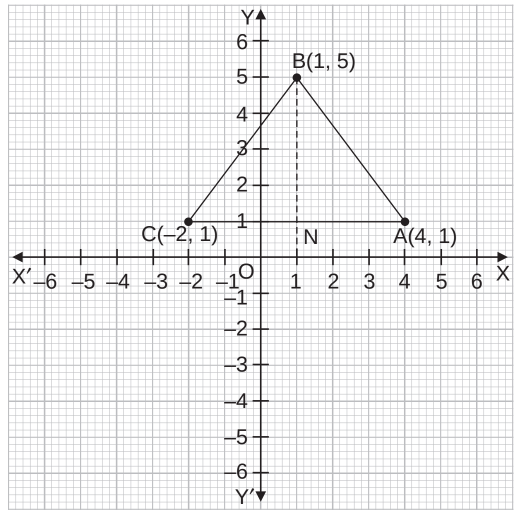
$$\text{ar}(\Delta ABC) = \frac{1}{2} AC \times BN$$

$$= \frac{1}{2} \times [4 - (-2)] \text{ units} \times (5 - 1) \text{ units}$$

$$= \frac{1}{2} \times (4 + 2) \text{ units} \times 4 \text{ units}$$

$$= \frac{1}{2} \times 6 \times 4 \text{ sq units}$$

= 12 sq units



3. $y - 2x = 4$

(*i*) Putting $x = 4$ or $y = 0$ in the given equation we get

LHS = 0 – 2 × 4 = – 8 ≠ 4 ≠ RHS

$\therefore$ (0, 4) is **not a solution** of the given equation.

(*ii*) Putting $x = -1$ and $y = 2$ in the given equation, we get

LHS = 2 – 2 (–1) = 2 + 2 = 4 = RHS

$\therefore$ (–1, 2) **is a solution** of the given equation.

(*iii*) Putting $x = 0$ and $y = 4$, in the given equation, we get

LHS = 4 – 2 (0) = 4 – 0 = 4 = RHS

$\therefore$ (0, 4) **is a solution** of the given equation.

4. Let (x, y) represent each ordered pair. Then, $y = 2x$.
So, the missing members will be

(*i*) (3, **6**)

(*ii*) (0, **0**),

(*iii*) (–2, **–4**),

(*iv*) $\left(\mathbf{\frac{11}{2}}, 11\right)$

(*v*) (**–4**, –8)

5. Let (x, y) represent each ordered pair. Then $x = y + 4$.
So, the missing members will be

(*i*) (**9**, 5)

(*ii*) $\left(\mathbf{4\frac{1}{2}}, \frac{1}{2}\right)$

(*iii*) (**4**, 0)

(*iv*) $\left(9\frac{1}{4}, \mathbf{5\frac{1}{4}}\right)$

(*vi*) (–8, **–12**)

6. (*i*) $3x - 2y = 0$

Putting $x = 3, y = 2$ in the given equation, we get

$$\begin{aligned} \text{LHS} &= 3 \times 3 - 2 \times 2 \\ &= 9 - 4 \\ &= 5 \neq 0 \\ &\neq \text{RHS} \end{aligned}$$

$\therefore$ (3, 2) is **not a solution** of the given equation.

(*ii*) $y = 3x + 1$

Putting $x = 7, y = 22$ in the given equation, we get

$$\text{LHS} = 22$$

and $$\begin{aligned} \text{RHS} &= 3 \times 7 + 1 \\ &= 21 + 1 \\ &= 22 \\ &= \text{LHS} \end{aligned}$$

$\therefore$ (7, 22) **is a solution** of the given equation.

(*iii*) $3x = y + 4$

Putting $x = -7$ and $y = -1$ in the given equation, we get

$$\begin{aligned} \text{LHS} &= 3 \times 7 \\ &= -21 \\ \text{RHS} &= -1 + 4 \\ &= 3 \\ &\neq \text{LHS} \end{aligned}$$

$\therefore$ (−7, −1) is **not a solution** of the given equation.

(*iv*) $4x + 3y = 2$

Putting $x = \frac{1}{4}$ and $y = \frac{1}{3}$ in the given equation, we get

$$\begin{aligned} \text{LHS} &= 4 \times \frac{1}{4} + 3 \times \frac{1}{3} \\ &= 1 + 1 \\ &= 2 \\ &= \text{RHS} \end{aligned}$$

$\therefore \left(\frac{1}{4}, \frac{1}{3}\right)$ **is a solution** of the given equation.

7. (*i*) Since (*k*, 2) lies on the graph of the given equation

$\therefore$ it must satisfy it.

Putting $x = k$ and $y = 2$ in the given, equation, we get

$\Rightarrow \quad k + 2 \times 2 = 5$

$\Rightarrow \quad k = 5 - 4$

$\Rightarrow \quad k = 1$

(*ii*) $x + 3y = 10$

Putting $x = 13$ and $y = k$ in the given equation, we get

$13 + 3k = 10$

$\Rightarrow \quad 3k = 10 - 13$

$\Rightarrow \quad 3k = -3$

$\Rightarrow \quad k = -1$

(*iii*) $3x + 2y = 22$

Putting $x = k$ and $y = 5$ in the given equation, we get

$3k + 2 \times 5 = 22$

$\Rightarrow \quad 3k + 10 = 22$

$\Rightarrow \quad 3k = 12$

$\Rightarrow \quad \boldsymbol{k = 4}$

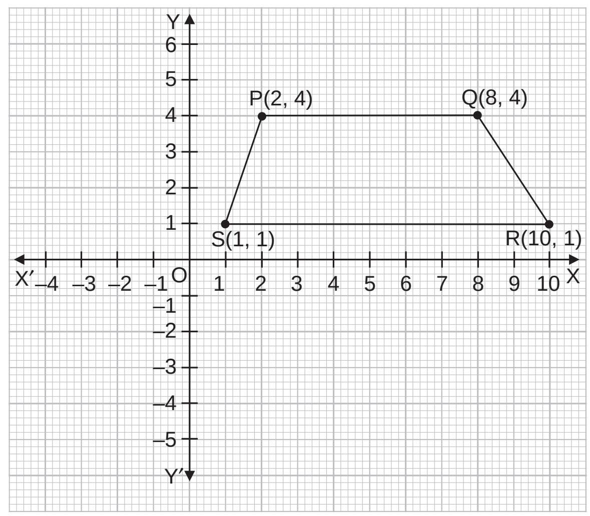
(*iv*) $x - y = 0$

Putting $x = k$ and $y = k$ in the given equation, we get

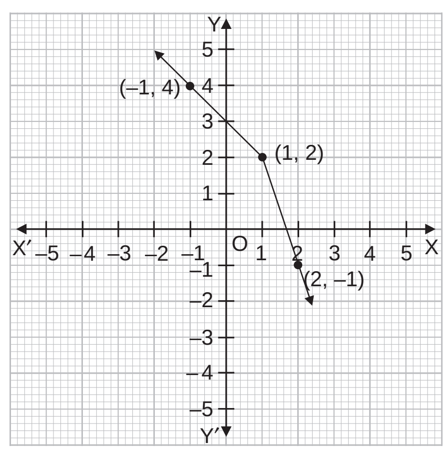
$k - k = 0$

$\Rightarrow$ ***k* = any real number**

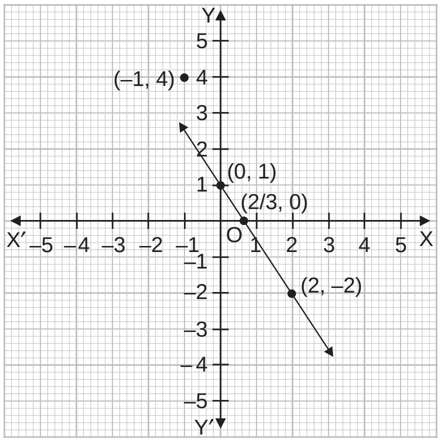
8. Trapezium

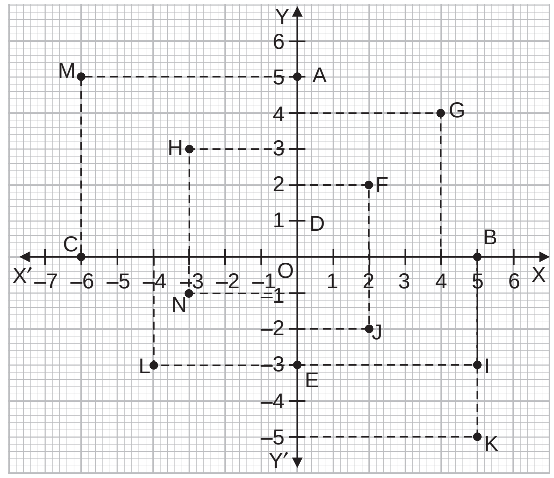


9. (*i*) **Non-collinear**



(*ii*) **Collinear**





10. Let P(x, y) be the point where

(*i*) Ordinate = 3, abscissa = – 5

$\Rightarrow$ $x < 0, y > 0$

$\therefore$ The point P will be in the **second quadrant**.

(*ii*) Abscissa = –3 and ordinate = –1

$\Rightarrow$ $x < 0, y < 0$

$\therefore$ The point P will be in the **third quadrant**.

(*iii*) Abscissa = 5 and ordinate = –3

$\Rightarrow$ $x > 0, y < 0$

$\therefore$ The point P will be in the **fourth quadrant**.

(*iv*) Ordinate = 5 and abscissa = 3

$\Rightarrow$ $x = 0, y > 0$

$\therefore$ The point P will be in the **first quadrant**.

11. (*i*) Point which lies on x and y-axis both is the point of intersection of these axes, i.e. origin and its coordinates are **(0, 0)**.

(*ii*) Abscissa (x-coordinate) of any point lying on the y-axis is 0. So the abscissa of the given point, lying the y-axis is 0. Its ordinate is –5.

Hence, its coordinates are **(0, –5)**.

(*iii*) Abscissa (x-coordinate) of the given point is 6. Ordinate (y-coordinate) of any point lying on the x-axis is 0. So the ordinate of this point lying on the x-axis is 0.

Hence its coordinates are **(6, 0)**.

12. (*i*) Abscissa of points lying on the y-axis is 0.

$\therefore$ Points whose abscissa is 0 are **A, D, E**.

(*ii*) Ordinate of points lying on the x-axis is 0.

$\therefore$ Points whose ordinate is 0 are **B, C**

(*iii*) Coordinates of H are (–3, 3), coordinates of J are (2, –2) and coordinates of K are (5, –5).

$\therefore$ Points whose abscissa and ordinate are equal but opposite in sign are **H, J, K**.

13. It is given that $2x + y = 4$

$\Rightarrow$ $y = 4 - 2x$

When $x = 1$,

then $y = 4 - 2 \times 1 = 2$,

so ordered pair is (1, 2).

When $x = 3$,

then $y = 4 - 2 \times 3$

$= -2$,

so ordered pair is (3, –2).

When $x = -1$,

then $y = 4 - 2 \times (-1)$

$= 6$,

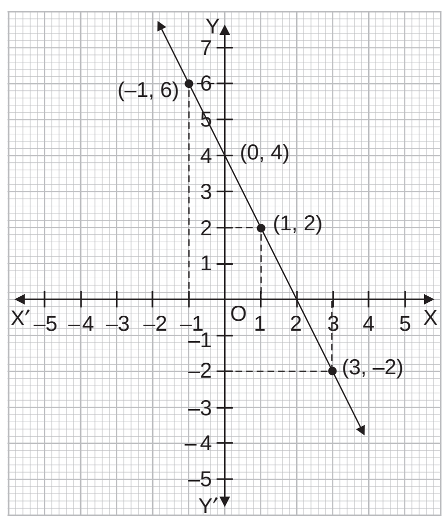
so ordered pair is (–1, 6).

On plotting the points (1, 2), (3, –2) and (–1, 6) and joining them, a straight line is obtained.

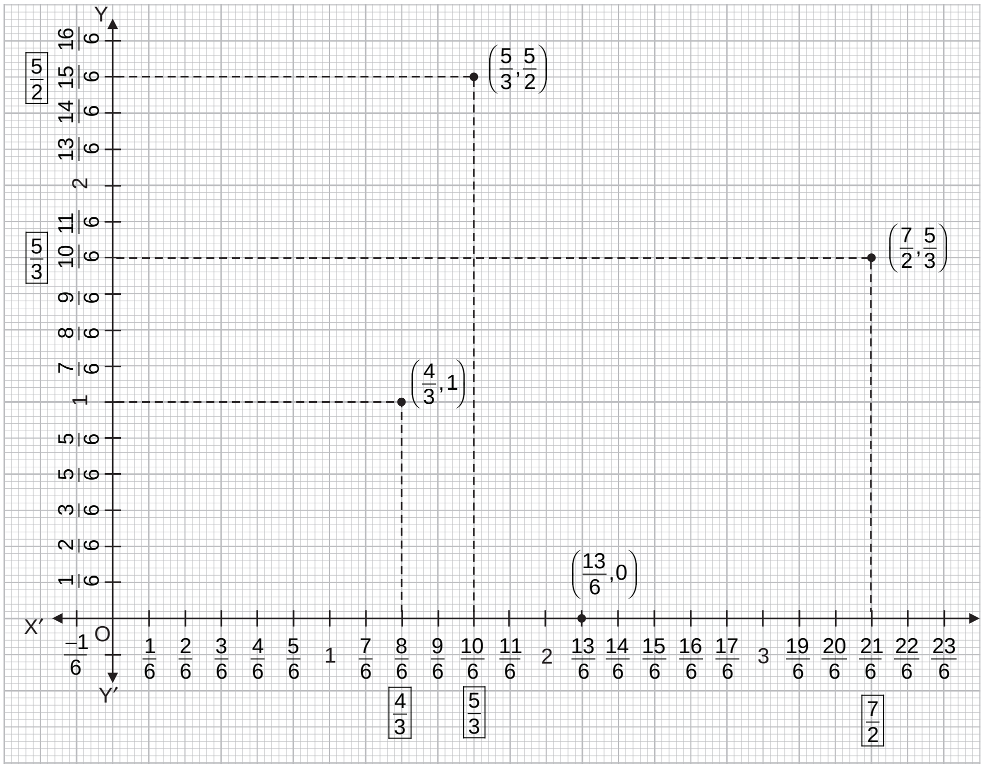
The graph line cuts the

(*i*) x-axis at **(2, 0)**

(*ii*) y-axis at **(0, 4)**



14.



15. It is given that $3x + 4y = 6$.

$\Rightarrow \quad y = \dfrac{6 - 3x}{4}$

$\therefore$ When $x = -2$,

$$y = \frac{6 - 3(-2)}{4} = \frac{12}{4} = 3,$$

so ordered pair is (–2, 3).

When $x = 2$,

$$y = \frac{6 - 3(2)}{4} = \frac{6 - 6}{4} = 0,$$

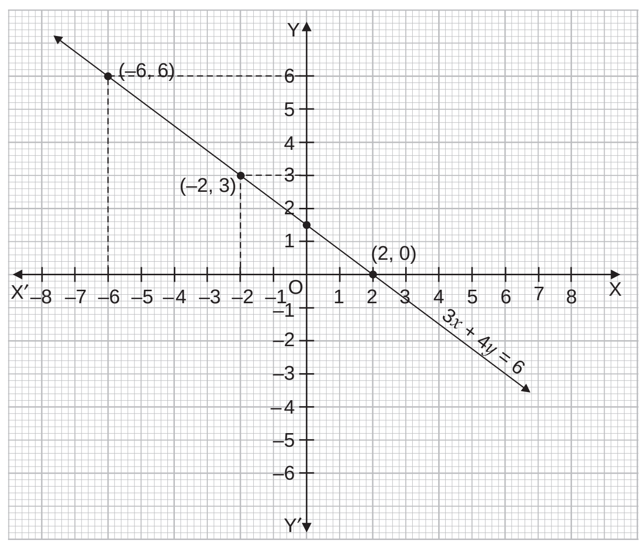
so ordered pair is (2, 0).

When $x = -6$,

$$y = \frac{6 - 3(-6)}{4} = \frac{6 + 18}{4} = \frac{24}{4} = 6,$$

so ordered pair is (–6, 6).

The points indicated by the ordered pairs already obtained have been plotted as shown in the graph given alongside.

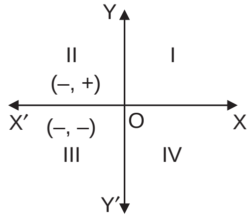


Infinite number of ordered pairs can be found by assigning any value to x and finding the corresponding value of y which satisfies $3x + 4y = 6$.

Thus, an infinite number of ordered pairs satisfying the given equation can be found and plotted.

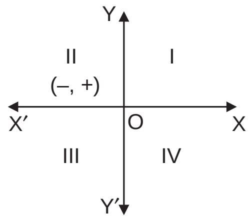
UNIT TEST

1. (*a*) **Origin**
   Origin is the point of intersection of two mutually perpendicular coordinate axes.
2. (*d*) **second or third quadrant**
   If abscissa (x-coordinate) of a point is negative and its ordinate is positive, then it lies in the second quadrant.



If abscissa (x-coordinate) of a point is negative and its ordinate is also negative, then it lies in the third quadrant.

3. (*b*) **Second quadrant**



Point (–2, 11) has a negative abscissa (x-coordinate) and a positive ordinate (y-coordinate), so it lies in the second quadrant.

4. (*b*) **0**

Abscissa of Q = –3, abscissa of P = –3

$\therefore$ (abscissa of Q) – (abscissa of P) = (–3) – (–3) = 0

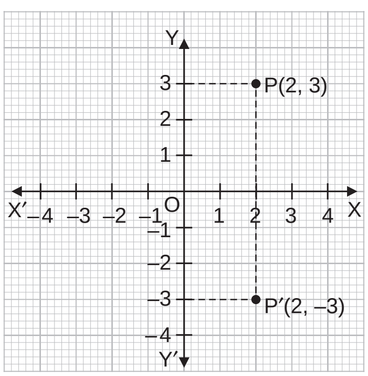
5. (*b*) **(0, –4)**

Abscissa of all points lying on the y-axis is 0.

Its ordinate is –4.

So, its coordinates are (0, –4).

6. (*d*) **(2, –3)**

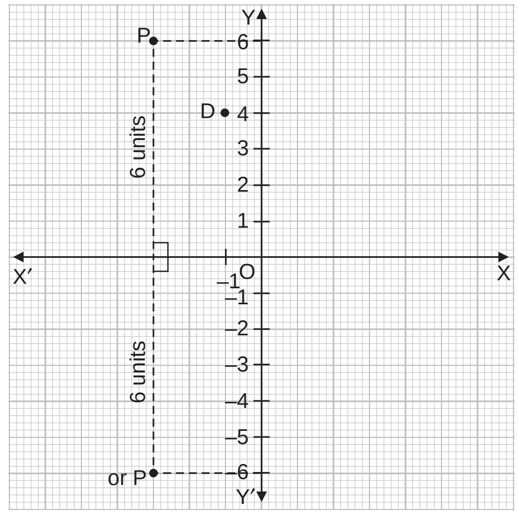


Mirror image P′ of point P(2, 3) in the x-axis will be found as far below the x-axis as the point P is above it and at the same distance from the y-axis. So P′(2, –3) are the coordinates of mirror image of P(2, 3) in the x-axis.

7. (*b*) ***y*-coordinate = 6 or – 6**

If point P lies above the negative direction of x-axis and the perpendicular distance of P from the x-axis is 6 units then its ordinate is 6.

If point P lies below the negative direction of x-axis, and the perpendicular distance of P from the x-axis is 6 units then its ordinate is –6.



8. (*c*) **P and R**

Abscissa of points on the y-axis is 0 and abscissa of P and R is 0. So they lie on the y-axis.

9. (*b*) **(5, 0)**

y-coordinate of all points lying on y-axis is 0.

x-coordinate of a point lying on y-axis satisfying equation $x + y = 5$ is given by putting $y = 0$ in the given equation.

$\Rightarrow \quad x + 0 = 5$

$\Rightarrow \quad x = 5$

So, the coordinates of the point lying on the x-axis and satisfying the equation $x + y = 5$ are (5, 0).

10. (*b*) **(0, –2)**

When the given line $2x - 7y = 14$ intersects the y-axis then its x-coordinate (abscissa) is 0.

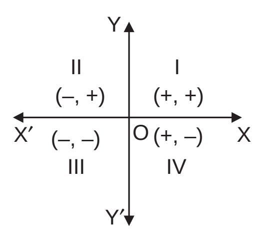
If y-coordinate of this point of intersection of y-axis and the line $2x - 7y = 14$ is given by putting $x = 0$ in the given equation

$\Rightarrow \quad 2 \times 0 - 7y = 14$

$y = -2$

$\therefore$ So the coordinates of the point at which the line $2x - 7y = 14$ intersects the y-axis are (0, –2).

11.



(*i*) $x > 0$

$\Rightarrow$ positive abscissa

$y > 0$

$\Rightarrow$ positive ordinate

$\therefore$ P(x, y) lies in quadrant I.

(*ii*) $x > 0$

$\Rightarrow$ positive abscissa

$y < 0$

$\Rightarrow$ negative ordinate

$\therefore$ P(x, y) lies in quadrant IV.

(*iii*) $x < 0$

$\Rightarrow$ negative abscissa

$y > 0$

$\Rightarrow$ positive ordinate

$\therefore$ P(x, y) lies in quadrant II.

(*iv*) $x < 0$

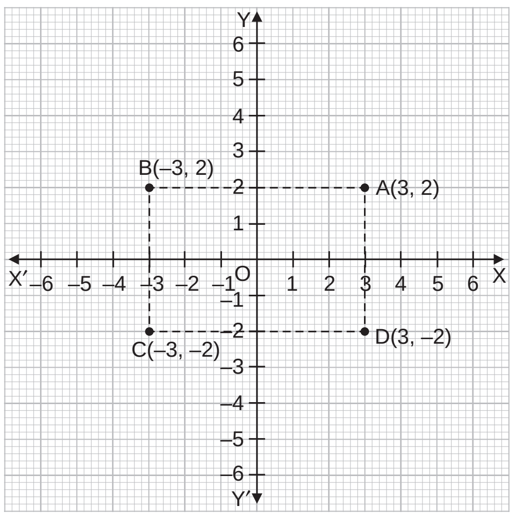
$\Rightarrow$ negative abscissa

$y < 0$

$\Rightarrow$ negative ordinate

$\therefore$ P(x, y) lies in quadrant III.

12.



The coordinates of point D should be **(3, –2)** for ABCD to be a rectangle.

13. The given equation is $x + y = 6$.

Putting $x = 7$ and $y = 13$ in $x + y = 6$, we get

$$\text{LHS} = 7 + 13 = 20 \neq 6 \neq \text{RHS}$$

$\therefore$ (7, 13) is not a member of the solution set of $x + y = 6$.

Putting $x = 8$ and $y = -2$ in $x + y = 6$, we get

$$\text{LHS} = 8 + (-2) = 6 = \text{RHS}$$

$\therefore$ **(8, –2) is a member of the solution set of $x + y = 6$.**

Putting $x = 2$ and $y = -6$ in $x + y = 6$, we get

$$\text{LHS} = 2 + (-6) = -4 \neq 6 \neq \text{RHS}$$

$\therefore$ (2, –6) is not a member of the solution set of $x + y = 6$.

Putting $x = 3$ and $y = 9$ in $x + y = 6$, we get

$$\text{LHS} = 3 + 9 = 12 \neq 6 \neq \text{RHS}$$

$\therefore$ (3, 9) is not a member of the solution set of $x + y = 6$.

14. If (x, y) lies on the line $3x + y = 10$, then its coordinates must satisfy the given equation.

$\Rightarrow$ $3x + 4 = 10$

$\Rightarrow$ $3x = 6$

$\Rightarrow$ $x = \mathbf{2}$

15. Let x be the abscissa and y the ordinate of the point.

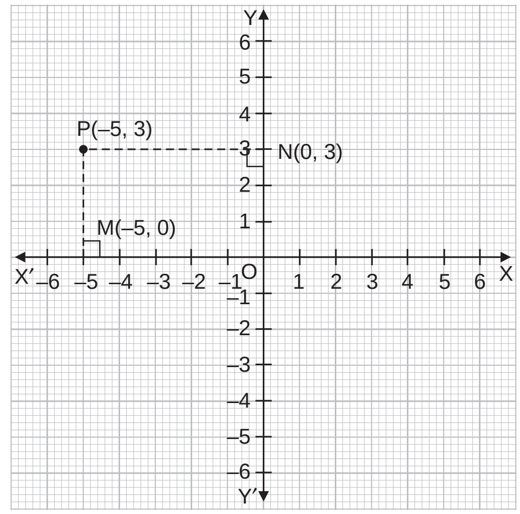
(*i*) Given twice the abscissa of the point + ordinate of that point = 4

$\Rightarrow$ $\mathbf{2x + y = 4}$

(*ii*) Given, twice the ordinate of the point – 3 times its abscissa = 6

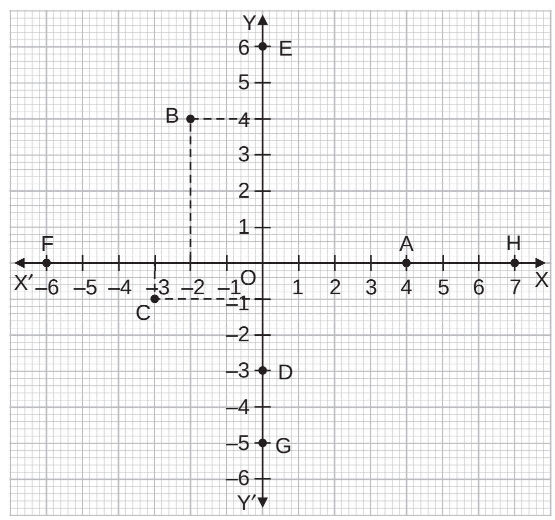
$\Rightarrow$ $\mathbf{2y - 3x = 6}$

16.



Coordinates of **M** lying on the x-axis are **(–5, 0)** and coordinates of **N** lying on the y-axis are **(0, 3)**.

17.



(*i*) Coordinates of A, B, C are

A(4, 0), B(–2, 4), C(–3, –1).

(*ii*) The point identified by D is

D (0, –3).

(*iii*) **Abscissa of point E is 0**.

Abscissa of point F is –6.

(*iv*) **Ordinate of point G is –5**.

(*v*) **Ordinate of point H is 0.**

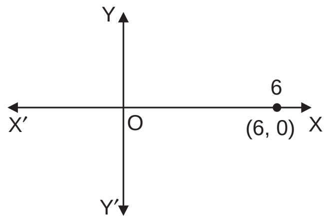
18. Since, the abscissa of points lying on the y-axis is 0.

$\therefore$ The points with 0 abscissa lie on the y-axis.

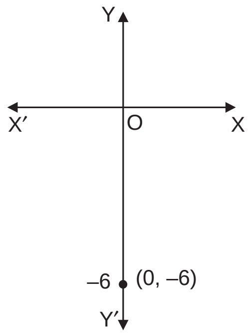
Hence, **L** (0, 6), **N** (0, –4), **O** (0, 0), **Y** (0, 1) and **Z** (0, 8) lies on the y-axis.

19. (*i*) Abscissa (x-coordinate) of a point lying on the positive direction of x-axis at a distance of 6 units from the y-axis is 6. Ordinate of this point lying on the x-axis is 0.

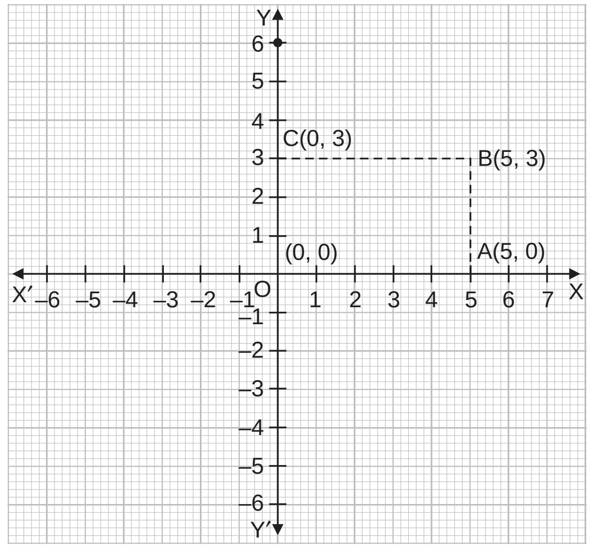
Hence, its coordinates are **(6, 0)**.



(*ii*) Abscissa (x-coordinate) of a point lying on the y-axis is 0.
Ordinate of this point lying on the direction of y-axis at a distance of 6 units from the x-axis is –6.
Hence, its coordinate are **(0, –6)**.



20.



In the given figure OABC represents the required rectangle whose vertices are **(0, 0), (5, 0), (5, 3), (0, 3).**