EXERCISE 3.1

Write the correct answer in each of the following:

1. Point (– 3, 5) lies in the

(*a*) first quadrant (*b*) second quadrant
(*c*) third quadrant (*d*) fourth quadrant

Sol. In the point (–3,5) abscissa is negative and ordinate is positive. So, it lies in the second quadrant.
Hence, (*b*) is the correct answer.

2. Signs of the abscissa and ordinate of a point in the second quadrant are respectively

(*a*) +, + (*b*) –, – (*c*) –, + (*d*) +, –

Sol. Signs of the abscissa and ordinate of a point in the second quadrant are –, +.
Hence, (*c*) is the correct answer.

3. Point (0, – 7) lies

(*a*) on the x-axis (*b*) in the second quadrant
(*c*) on the y-axis (*d*) in the fourth quadrant

Sol. Point (0, – 7) lies on y-axis.
Hence, (*c*) is the correct answer.

4. Point (– 10, 0) lies

(*a*) on the negative direction of x-axis
(*b*) on the negative direction of y-axis
(*c*) in the third quadrant
(*d*) in the fourth quadrant

Sol. Point (– 10, 0) lies on the negative direction of x-axis.
Hence, (*a*) is the correct answer.

5. Abscissa of all the points on the x-axis is

(*a*) 0 (*b*) 1 (*c*) 2 (*d*) any number

Sol. Abscissa of all the points on the x-axis is any number.
Hence, (*d*) is the correct answer.

6. Ordinate of all the points on the x-axis is

(*a*) 0 (*b*) 1 (*c*) – 1 (*d*) any number

Sol. Ordinate of all the points on the x-axis is 0.
Hence, (*a*) is the correct answer.

7. The point at which the two coordinate axes meet is called the

(*a*) abscissa (*b*) ordinate (*c*) origin (*d*) quadrant

Sol. The point at which the two coordinate axes meet is called the origin.
Hence, (*c*) is the correct answer.

8. A point both of whose coordinates are negative will lie in

(*a*) I quadrant (*b*) II quadrant (*c*) III quadrant (*d*) IV quadrant

Sol. A point whose both of the coordinates are negative will lie in III quadrant.
Hence, (*c*) is the correct answer.

9. Points $(1, -1), (2, -2), (4, -5), (-3, -4)$

(*a*) lie in II quadrant (*b*) lie in III quadrant

(*c*) lie in IV quadrant (*d*) do not lie in the same quadrant

Sol. Points $(1, -1), (2, -2), (4, -5)$ lie in IV quadrant and $(-3, -4)$ lie in III quadrant.
Hence, (*d*) is the correct answer.

10. If y-coordinate of a point is zero, then this point always lies

(*a*) in I quadrant (*b*) in II quadrant

(*c*) on x-axis (*d*) on y-axis

Sol. We know that if y-coordinate of a point, *i.e.*, ordinate is zero, then this point always lies on x-axis.
Hence, (*c*) is the correct answer.

11. The points $(-5, 2)$ and $(2, -5)$ lie in the

(*a*) same quadrant

(*b*) II and III quadrants, respectively

(*c*) II and IV quadrants, respectively

(*d*) IV and II quadrants, respectively

Sol. The points $(-5, 2)$ and $(2, -5)$ lie in the II and IV quadrants, respectively.
Hence, (*c*) is the correct answer.

12. If the perpendicular distance of a point P from the x-axis is 5 units and the foot of the perpendicular lies on the negative direction of x-axis, then the point P has

(*a*) x-coordinate $= -5$ (*b*) y-coordinate $= 5$ only

(*c*) y-coordinate $= -5$ only (*d*) y-coordinate $= 5$ or -5

Sol. The point P has y-coordinate $= 5$ or -5.
Hence, (*d*) is the correct answer.

13. On plotting the points O(0, 0), A(3, 0), B(3, 4), C(0, 4) and joining OA, AB, BC and CO, which of the following figures is obtained?

(*a*) Square (*b*) Rectangle (*c*) Trapezium (*d*) Rhombus

Sol. OABC is a rectangle.
Hence, (*b*) is the correct answer.

14. If P(– 1, 1), Q(3, – 4), R(1, – 1), S(– 2, – 3) and T(– 4, 4) are plotted on the graph paper, then the points in the fourth quadrant are

(*a*) P and T (*b*) Q and R (*c*) Only S (*d*) P and R

Sol. We know that quadrant IV consists of all points (x, y) for which x is positive and y is negative.
So, the points in the fourth quadrants are Q(3, – 4) and R(1, –1).
Hence, (*b*) is the correct answer.

15. If the coordinates of two points are P(– 2, 3) and Q(– 3, 5), then (abscissa of P) – (abscissa of Q) is

(*a*) – 5 (*b*) 1 (*c*) – 1 (*d*) – 2

Sol. Abscissa of P (–2, 3) = – 2

Abscissa of Q (– 3, 5) = – 3

$\therefore$ (abscissa of P) – (abscissa of Q) = – 2 – (– 3) = – 2 + 3 = 1

Hence, (*b*) is the correct answer.

16. If P(5, 1), Q(8, 0), R(0, 4), S(0, 5) and O(0, 0) are plotted on the graph paper, then the point(s) on the *x*-axis are

(*a*) P and R (*b*) R and S (*c*) Only Q (*d*) Q and O

Sol. We know that if a point lies on the *x*-axis, its ordinate is 0.

So, the points on the *x*-axis are Q(8, 0) and O(0, 0).

Hence, (*d*) is the correct answer.

17. Abscissa of a point is positive in

(*a*) I and II quadrants (*b*) I and IV quadrants

(*c*) I quadrant only (*d*) II quadrant only

Sol. Abscissa of a point is positive in I and IV quadrants.

Hence, (*b*) is the correct answer.

18. The point whose abscissa and ordinate have different signs will lie in

(*a*) I and II quadrants (*b*) I and IV quadrants

(*c*) I quadrant only (*d*) II and IV quadrants only

Sol. In II quadrant, all (x, y) lie with $x < 0$ and $y > 0$. In quadrant IV, all (x, y) lie with $x > 0$ and $y < 0$.

So, the point whose abscissa and ordinate have different signs will lie in II and IV quadrant only.

Hence, (*d*) is the correct answer.

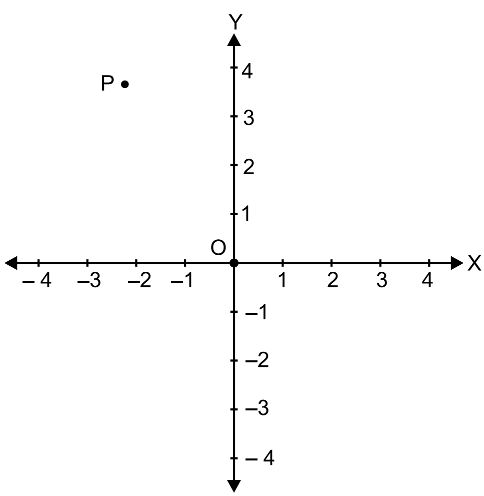
19. In the given figure, coordinates of P are

(*a*) (– 4, 2)

(*b*) (– 2, 4)

(*c*) (4, – 2)

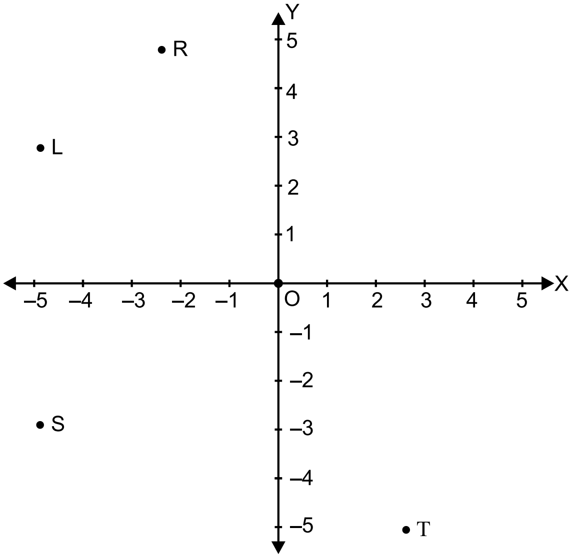
(*d*) (2, – 4)



Sol. Point P lies in the second quadrant and its distances from *y* and *x*-axes are – 2 and 4 units respectively. So, its coordinates are (–2,4).

Hence, (*b*) is the correct answer.

20. In the given figure, the point identified by the coordinates (– 5, 3) is
(*a*) T (*b*) R (*c*) L (*d*) S



Sol. Clearly, point T lies in the fourth quadrant. The distance of T from y-axis is 3 units and from x-axis is –5 units. So, the point identified by the coordinates (–5,3) is T.
Hence, (*a*) is the corrrect answer.

21. The point whose ordinate is 4 and which lies on y-axis is
(*a*) (4, 0) (*b*) (0, 4) (*c*) (1, 4) (*d*) (4, 2)

Sol. The point on the y-axis has its abscissa 0. So, the point whose ordinate is 4 and which lies on y-axis is (0, 4).
Hence, (*b*) is the correct answer.

22. Which of the points P(0, 3), Q(1, 0), R(0, –1), S(– 5, 0), T(1, 2) do not lie on the x-axis?
(*a*) P and R only (*b*) Q and S only
(*c*) P, R and T (*d*) Q, S and T

Sol. We know that a point on the x-axis has always its ordinate equal to 0. So, the points which do not lie on the x-axis are P (0, 3), R (0, –1) and T (1, 2).
Hence, (*c*) is the correct answer.

23. The point which lies on y-axis at a distance of 5 units in the negative direction of y-axis is
(*a*) (0, 5) (*b*) (5, 0) (*c*) (0, – 5) (*d*) (– 5, 0)

Sol. A point on the y-axis has its abscissa equal to 0.

So, the point on the y-axis at a distance of 5 units in the negative direction of y-axis is $(0, -5)$.

Hence, (*c*) is the correct answer.

24. The perpendicular distance of the point P(3, 4) from the y-axis is

(*a*) 3 (*b*) 4 (*c*) 5 (*d*) 7

Sol. The perpendicular distance of the point P(3, 4) from the y-axis is abscissa (x-coordinate) of the point (3, 4), which is 3.

Hence, (*a*) is the correct answer.

EXERCISE 3.2

1. Write whether the following statements are true or false. Justify your answer.

(*i*) Point (3, 0) lies in the first quadrant.

Sol. The point (3, 0) has abscissa 3, the x-coordinate and ordinate is 0. If the ordinate of a point is zero, the point lies on the x-axis.

Hence, the given statement is false.

(*ii*) Points (1, –1) and (– 1, 1) lie in the same quadrant.

Sol. The point (1, –1) lies in IV quadrant and the point (– 1, 1) lies in II quadrant.

Hence, the given statement is false.

(*iii*) The coordinates of a point whose ordinate is $-\frac{1}{2}$ and abscissa is 1 are $\left(-\frac{1}{2}, 1\right)$.

Sol. We know that in the coordinates of a point, the abscissa comes first and then the ordinate. So, the coordinates of a point are $\left(1, -\frac{1}{2}\right)$ and not $\left(-\frac{1}{2}, 1\right)$.

Hence, the given statement is false.

(*iv*) A point lies on y-axis at a distance of 2 units from the x-axis. Its coordinates are (2, 0).

Sol. Any point which lies on the y-axis is of the form $(0, y)$.

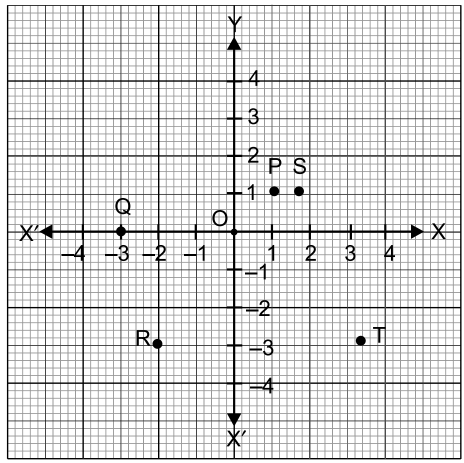
Hence, the given statement is false.

(*v*) (– 1, 7) is a point in the II quadrant.

Sol. In the II quadrant, signs of abscissa and ordinate are –, + respectively. Hence, the statement that (– 1, 7) is a point in the II quadrant is a true statement.

EXERCISE 3.3

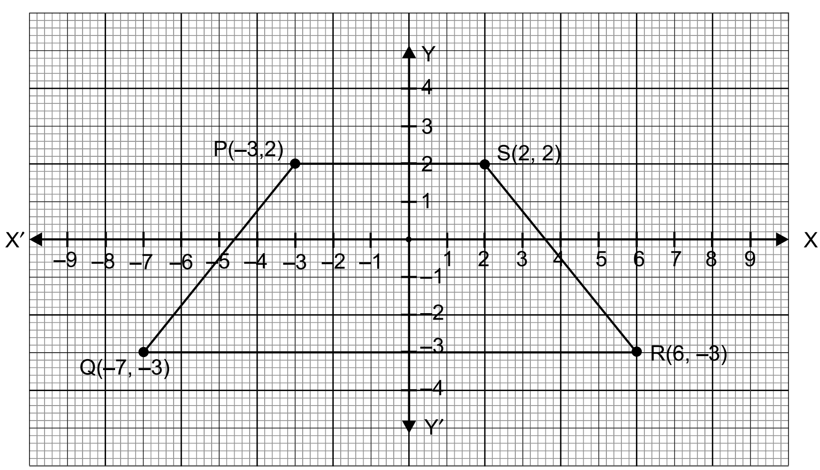
1. Write the coordinates of each of the following points P, Q, R, S, T and O from the figure given below.



Sol. The coordinates of the points P, Q, R, S, T and O are P(1, 1), Q(–3, 0), R(– 2, – 3), S(2, 1), T(4, – 2) and O(0, 0).

2. Plot the following points and write the name of the figure obtained by joining them in order: P(– 3, 2), Q(– 7, – 3), R(6, – 3), S(2, 2)

Sol. Let X′OX and Y′OY be the coordinate axes. Then, the four points may be plotted as given below:

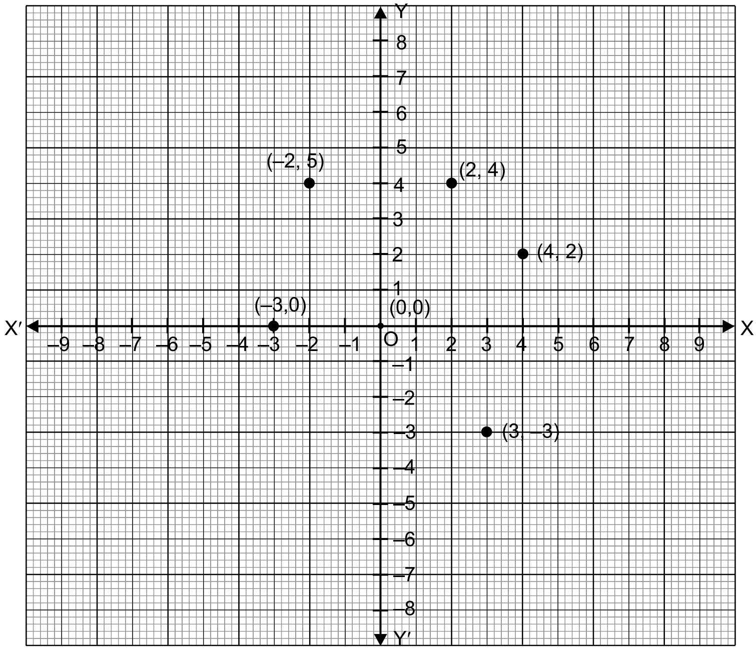


Trapezium PQRS

3. Plot the points (x, y) given by the following table:

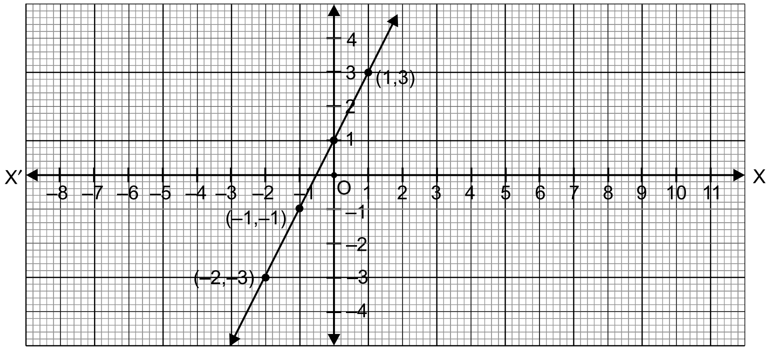
x	2	4	– 3	– 2	3	0
y	4	2	0	5	– 3	0

Sol. Let X′OX and Y′OY be the coordinate axes. Then, the given points may be plotted as given below:



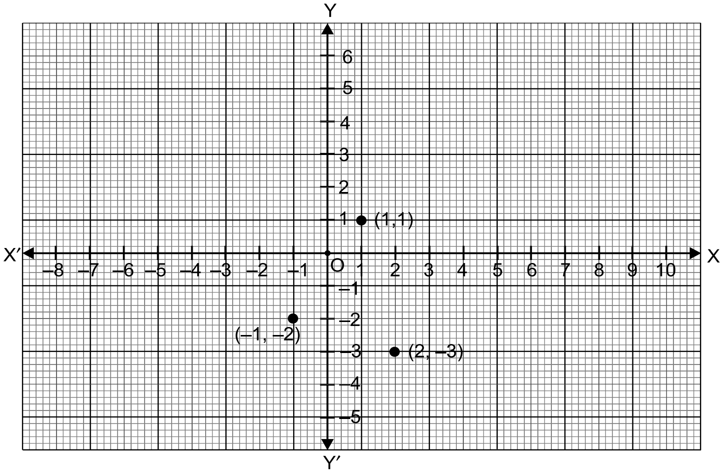
4. Plot the following points and check whether they are collinear or not:
(*i*) (1, 3), (– 1, – 1), (– 2, – 3) (*ii*) (1, 1), (2, – 3), (– 1, – 2)
(*iii*) (0, 0), (2, 2), (5, 5)

Sol. (*i*)



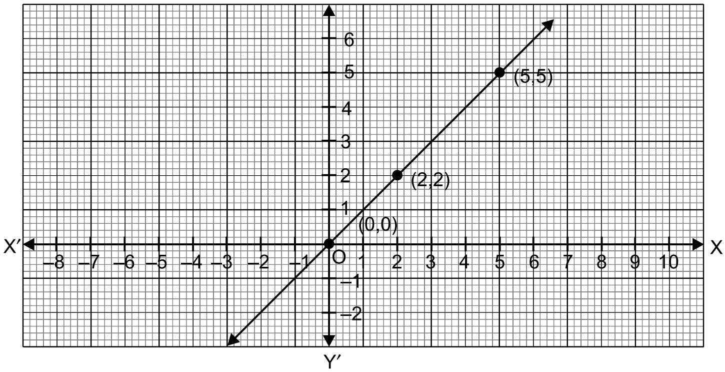
From the graph, we find that all the three points lie on the same straight line. Hence, the given points are collinear.

(*ii*)



From the graph, we find that all the three points do not lie on the same straight line. Hence, the given points are not collinear.

(*iii*)



From the graph, we find that all the three points lie on the same straight line. Hence, the given points are collinear.

5. Without plotting the points indicate the quadrant in which they wil lie, if

(*i*) ordinate is 5 and abscissa is – 3

(*ii*) abscissa is – 5 and ordinate is – 3

(*iii*) abscissa is – 5 and ordinate is 3

(*iv*) ordinate is 5 and abscissa is 3

Sol. (*i*) In the point (– 3, 5) abscissa is negative and ordinate is positive, so it lies in the second quadrant.

(*ii*) In the point (– 5, – 3) abscissa and ordinate both are negative, so it lies in the third quadrant.

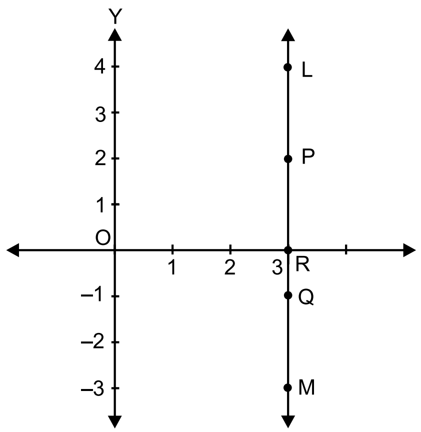
(*iii*) In the point (– 5, 3) abscissa is negative and ordinate is positive, so it lies in the second quadrant.

(*iv*) In the point (3, 5) abscissa and ordinate both are positive, so it lies in the first quadrant.

6. In the given figure, LM is a line parallel to the y-axis at a distance of 3 units.

(*i*) What are the coordinates of the points P, R and Q?

(*ii*) What is the difference between the abscissa of the points L and M?



Ans. (*i*) Clearly, the distance of P from y-axis is 3 units and that of from x-axis is 2 units. Since P lies in the first quadrant, so its coordinates are (3, 2).

Point R lies on x-axis and its distances from y and x-axes are 3 and 0 units respectively. So, its coordinates are (3, 0).

Clearly, point Q lies in the fourth quadrant. The distance of Q from y-axis is 3 units and from x-axis is 1 unit. So, the coordinates of Q are (3, – 1).

(*ii*) From the given figure (graph), we find that the points L and M lie on the same straight line. So, L and M are collinear.

Hence, the difference between the abscissa of the points L and M is 0.

7. In which quadrant or on which axis do each of the following points lie?

(– 3, 5), (4, –1), (2, 0), (2, 2), (– 3, – 6)

Sol. (*i*) (– 3, 5) lies in II quadrant.

(*ii*) (4, –1) lies in IV quadrant.

(*iii*) (2, 0) lies on x-axis.

(*iv*) (2, 2) lies in Ist quadrant.

(*v*) (– 3, – 6) lies in the third quadrant.

8. Which of the following points lie on y-axis?

A(1, 1), B(1, 0), C(0, 1), D(0, 0), E(0, – 1), F(– 1, 0), G(0, 5), H(– 7, 0), I(3, 3).

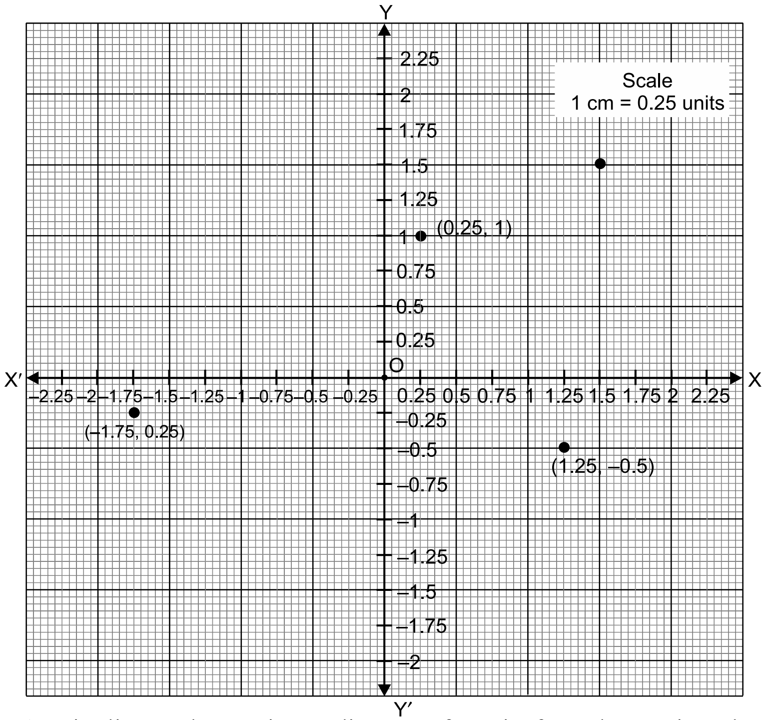
Sol. We know that if a point lies on the y-axis, its abscissa is 0 and its ordinate is the y-value and its coordinate are (0, y).

Hence, C(0, 1), E(0, – 1), G(0, 5) are the points which lie on y-axis.

9. Plot the points (x, y) given by the following table. Use scale 1 cm = 0.25 units.

x	1.25	0.25	15	– 1.75
y	– 0.5	1	1.5	– 0.25

Sol. Let X′OX and Y′OY be the coordinate axes. Then, the given points may be plotted as given below:



10. A point lies on the x-axis at a distance of 7 units from the y-axis. What are its coordinates? What will be the coordinates if it lies on y-axis at a distance of – 7 units from x-axis?

Sol. The given point lies on the x-axis. The distance of this point from y-axis is 7 units and from x-axis is 0. So, its coordinates are (7, 0).
If it lies on y-axis, then the distance of it from y-axis is 0 and that of from x-axis is 7 units. So, its coordinates are (0, 7).

11. Find the coordinates of the point

(*i*) which lies on x and y axes both.

(*ii*) whose ordinate is – 4 and which lies on y-axis.

(*iii*) whose abscissa is 5 and which lies on x-axis.

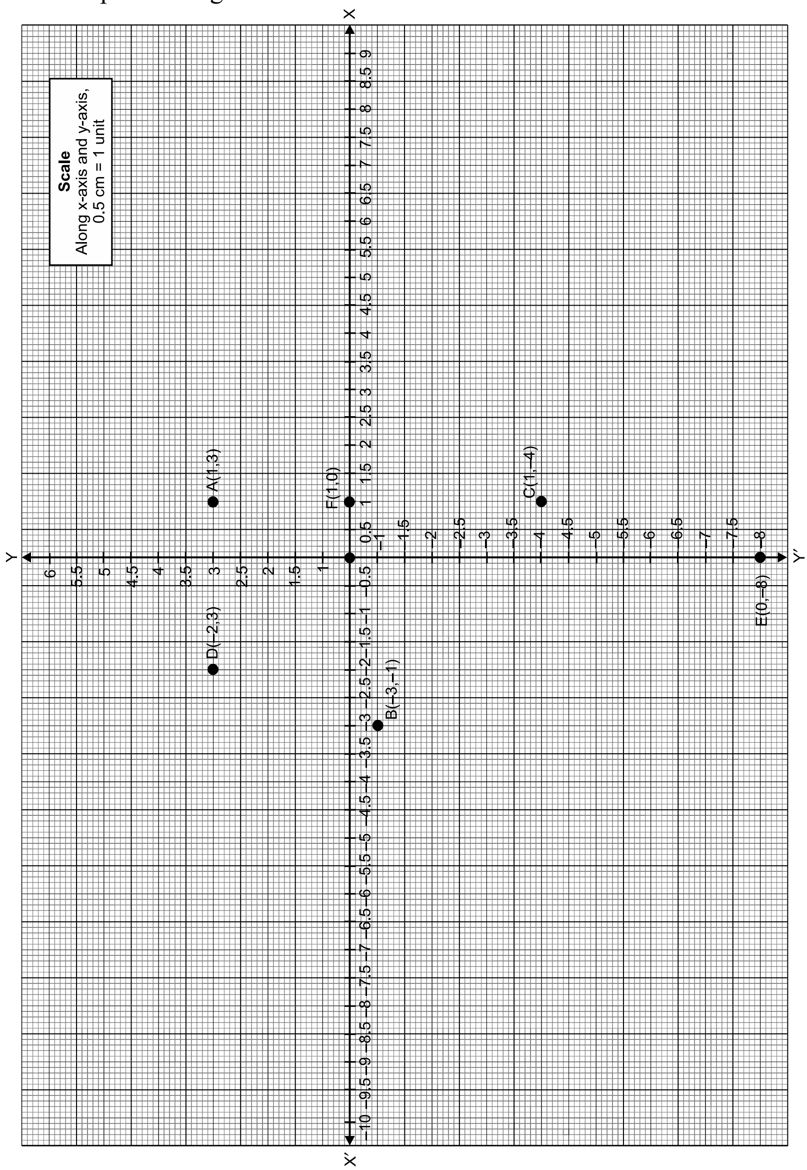
Sol. (*i*) The coordinates of the point which lies on both the axes are (0, 0).

(*ii*) The coordinates of the point whose ordinate is – 4 and which lies on y-axis are (0, – 4).

(*iii*) The coordinates of the point whose abscissa is 5 and which lies on x-axis are (5, 0).

12. Taking 0.5 cm as 1 unit, plot the following points on the graph paper: A(1, 3), B(– 3, – 1), C(1, – 4), D(–2, 3), E(0, – 8), F(1, 0)

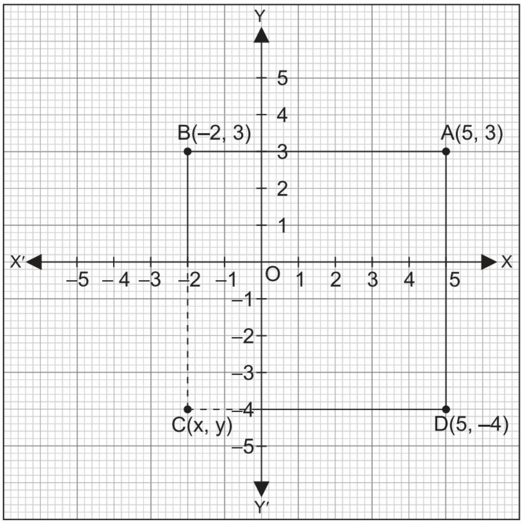
Sol. Let $X'OX$ and $Y'OY$ be the coordinate axes. Then, the given points may be plotted as given below:

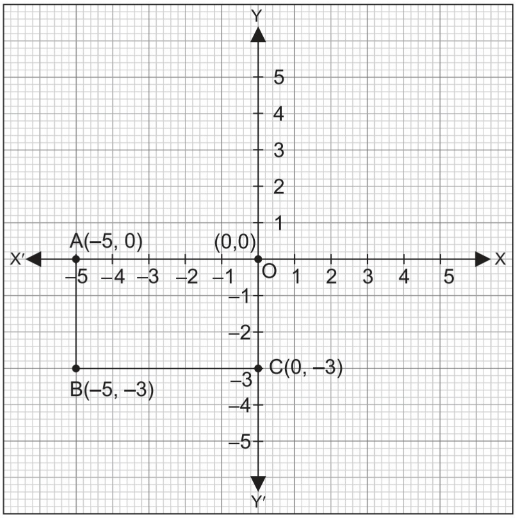


EXERCISE 3.4

1. Points A(5, 3), B(– 2, 3) and D(5, – 4) are three vertices of a square ABCD. Plot these on a graph paper and hence find the coordinates of the vertex C.

Sol. Plot the points A(5, 3), B(– 2, 3) and D(5, – 4). Join AB and AD. As ABCD is a square, so all its sides are equal and each angle is of 90° measure. Therefore, the abscissa of the vertex C will be – 2 and ordinate – 4. Hence, the coordinates of the vertex C are (– 2, – 4).



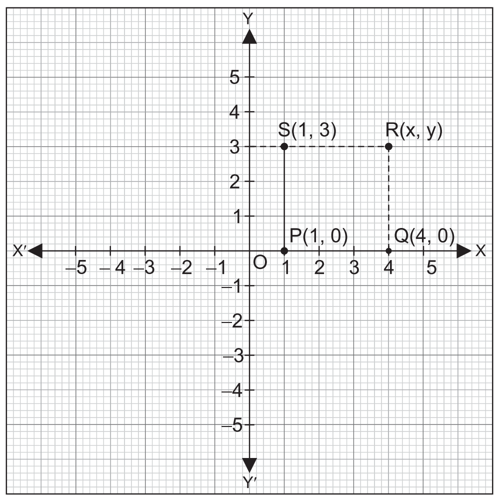


2. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively, one vertex at the origin, the longer side lies on the x-axis and one of the vertices lies in the III quadrant.

Sol. As the length and breadth of the rectangle are 5 and 3 units respectively, one vertex at the origin, the longer side lies on the x-axis and one of the vertices lies in the III quadrant, so the coordinates of the vertices of a rectangle OABC are O(0,0), A (– 5, 0), B(– 5,– 3) and C(0, – 3).

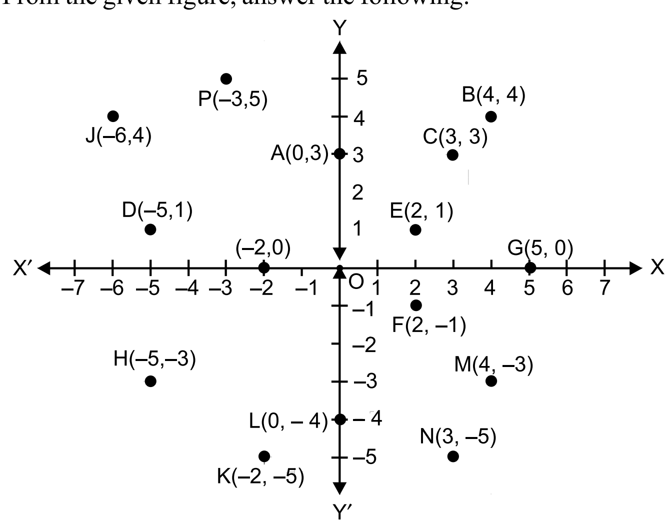
3. Plot the points P(1, 0), Q(4, 0) and S(1, 3). Find the coordinates of the point R such that PQRS is a square.

Sol. Plot the points P(1,0), Q(4, 0) and S(1, 3) in the cartesian plane. As we know all the sides of a square are equal and each angle is of 90° measure. Therefore, the abscissa of the vertex R is 4 and its ordinate is 3.



Hence, the coordinates of the point R are (4, 3).

4. From the given figure, answer the following:



(*i*) Write the points whose abscissa is 0.
(*ii*) Write the points whose ordinate is 0.
(*iii*) Write the points whose abscissa is – 5.

Sol. (*i*) Clearly, the distance of points A, L and O from y-axis is 0. So, A(0, 3), L(0, – 4) and O(0, 0) are the points whose abscissa is 0.

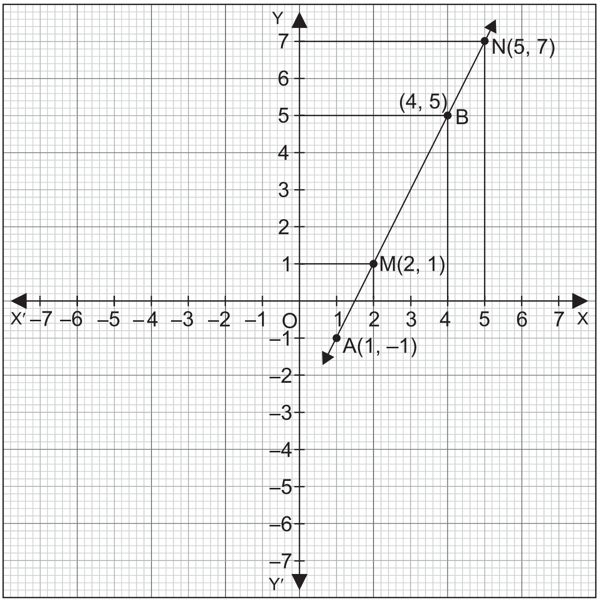
(*ii*) Clearly, the distance of points G, I and O from x-axis is 0. So, G(5, 0), I(– 2, 0) and O(0, 0) are the points whose ordinate is 0.

(*iii*) Clearly, the distance of points H and D from y-axis is 5 units and both lie in second and third quadrants respectively. So, H(– 5, – 3) and D(– 5, 1) are the points whose abscissa is – 5.

5. (*i*) Plot the points A(1, – 1) and B(4, 5). Draw a line segment joining these points. Write the coordinates of a point on this line segment between the points A and B.

(*ii*) Extend this line segment and write the coordinates of a point on this line which lies outside the line segment AB.

Sol. (*i*) M (2, 1) is a point on this line segment between the points A and B.



(*ii*) N(5, 7) is a point on this line which lies outside the line segment AB.