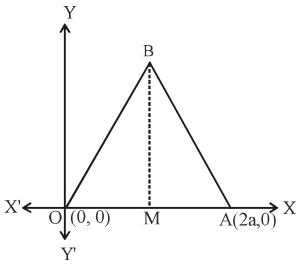
Example 8 :

If the side of an equilateral triangle is 2a, find the coordinate of its vertices.



Sol. In figure, OAB is an equilateral triangle of 2a.

$\therefore$ OA = AB = OB = 2a

Now, from the point B, draw BM perpendicular on OA.

$\therefore$ OM = MA = a

Therefore from right triangle OMB,

$OB^2 = OM^2 + MB^2$ or $(2a)^2 = (a)^2 + MB^2$ or $MB^2 = 3a^2$ $\therefore$ MB = $\sqrt{3}a$

Hence the coordinates of vertices of equilateral triangle are O (0, 0), A (2a, 0) and $B(a, \sqrt{3}a)$

because OM = a and MB = $\sqrt{3}a$

QUESTION BANK

EXERCISE - 1

Q.1 Explain Cartesian system briefly.

Q.2 What are quadrants in a Cartesian plane.

Q.3 What is the name of horizontal and vertical lines drawn in Cartesian plane to determine the position of a point ? Name each part of plane and name of point of intersection.

Q.4 What are the coordinates of the origin.

Q.5 Write the answer of each of the following questions :

(i) What is the name of horizontal and the vertical lines drawn to determine the position of any point in the Cartesian plane

(ii) What is the name of each part of the plane formed by these two lines ?

(iii) Write the name of the point where these two lines intersect.

Q.6 In which quadrant or on which axis do each of the points (–2, 4), (3, –1), (–1, 0), (1, 2) and (–3, –5) lie? Verify your answer by locating them on the Cartesian plane.

Q.7 Taking rectangular axes, plot the points O (0, 0), P (3, 0) and R (0, 4). Find the coordinate of the fourth point Q such that OPQR forms a rectangle.

Q.8 If the coordinates of the mid points of the sides of a triangle are (1, 2), (0, –1) and (2, –1). Find the coordinate of its vertices.

Q.9 Plot the points A, B, C, D, E from the table given below :

Point	A	B	C	D	E
Abscissa	–7	–3	5	2	–3
Ordinate	2	0	–4	2	+2

and answer the following :

(i) Coordinates of A, B, C, D, E ? (ii) Measure AC, DC, AD ?

(iii) Shade the triangle. (iv) Verify that AD + DC > AC.

EXERCISE - 2

Q.1 A (–2, 4), C (4, 10) and D (–2, 10) are the vertices of a squares ABCD. Use graphical method to find the co-ordinates of the fourth vertex B. Also, find :

(i) the co-ordinates of the mid-point of BC

(ii) the co-ordinates of the mid-point of CD

(iii) the co-ordinates of the point of intersection of the diagonals of the square ABCD.

Q.2 Find the co-ordinate of the image of each of the following points under reflection in the origin.
(i) (2, –3) (ii) (–7, 2) (iii) (–3, –6) (iv) (2, 1/2) (v) (5/2, 0) (vi) (0, 9)

Q.3 Which of the following points do not lie in any quadrants? (3, 4), (0, 5), (6, 9), (4, 0)

Q.4 Draw the quadrilateral with vertices (– 4, 4), (–6, 0), (–4,–4), (–2, 0). Name the type of quadrilateral and find its area.

EXERCISE - 3

Fill in the blanks –

Q.1 Draw a quadrilateral whose vertices are (1, 4), (–5, 4), (–5, –3) and (1, –3). The type of quadrilateral is .....

Q.2 The points (–2, 0), (2, 0), (2, 2), (0, 4), (–2, 2) are joined in order. Figure is .....

Q.3 The opposite vertices of a square are (5, 4) and (–3,2) the length of its diagonal is .....

Q.4 One end of a line is (4, 0) and the mid point is (4, 1). Are the coordinates of the other end .....

Q.5 If P (2, –1), Q (3, 4), R (–2, 3) and S (–3, –2) be four points in the plane, PQRS is a .....

True-False Statement :

Q.6 The ordinate of a point in its x-coordinate.

Q.7 The point (a, b) lies on y-axis if b = 0

Q.8 The origin is in the first quadrant.

Q.9 The origin (0, 0) lies on x-axis.

Q.10 If the ordinate of a point is equal to its abscissa, the point lies either in the first quadrant or in the second quadrant.

Q.11 The y-axis is the vertical number line.

Q.12 Every point is located in one of the four quadrant.

EXERCISE - 4

Q.1 The quadrilateral, whose vertices are (–1, 1), (0, –3), (5,2) and (4, 6) is –
(A) a square (B) a rectangle (C) a rhombus (D) a parallelogram

Q.2 The distance between two points (0, 3) and (–2, 0) is –
(A) $\sqrt{14}$ (B) $\sqrt{15}$ (C) $\sqrt{13}$ (D) $\sqrt{5}$

Q.3 The distance of the point (3, 4) from y-axis is –
(A) 1 (B) 4 (C) 2 (D) 3

Q.4 The triangle, whose vertices are (2, 1), (2, –2) and (5, 2) is–
(A) Right angled triangle (B) Equilateral triangle
(C) Isosceles (D) None of them

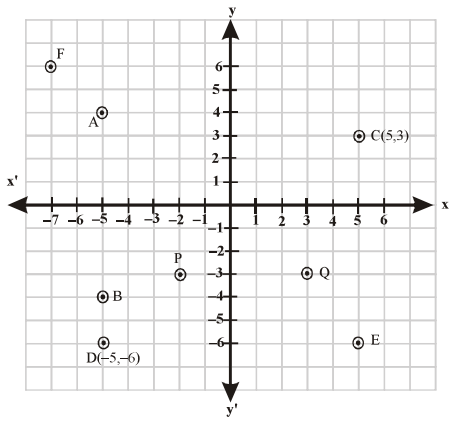
Q.5 The distance of the point (5, –2) from x-axis is –
(A) 5 (B) –2 (C) 3 (D) 2

Q.6 In the given figure, find Coordinate of A–
(A) (–5, 4) (B) (5, 4)
(C) (–5, – 4) (D) (4, 5)

Q.7 In the given figure, points identified by the coordinates (–2, –3)
(A) P (–2, –3) (B) Q (–2, –3)
(C) A (–2, –3) (D) C (–2, –3)

Q.8 In the given figure, find Abscissa of C–
(A) 4 (B) 5
(C) 6 (D) 7

Q.9 In the given figure, find Coordinate of the point E
(A) (1, 2) (B) (5, –6)
(C) (5, 6) (D) (–5, –6)



Q.10 In the figure, the coordinates of B are –

(A) (–3, 4) (B) (4, 3)

(C) (–5, –4) (D) (3, – 4)

Q.11 In the figure, the coordinates of M are –

(A) (–3, 4) (B) (4, 3)

(C) (–5, –4) (D) (3, – 4)

Q.12 In the figure, the coordinates of L are –

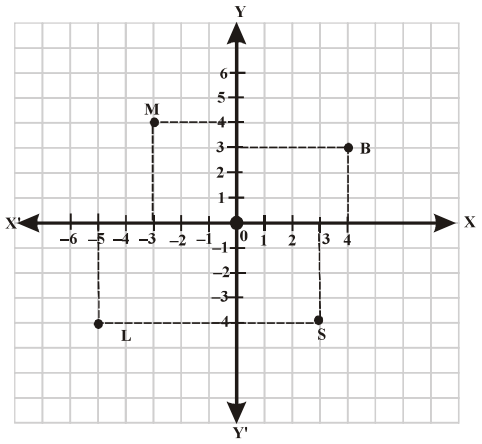
(A) (–3, 4) (B) (4, 3)

(C) (–5, –4) (D) (3, – 4)

Q.13 In the figure, the coordinates of S are –

(A) (–3, 4) (B) (4, 3)

(C) (–5, –4) (D) (3, – 4)



EXERCISE - 5

Match the column– Each question contains statements given in two columns which have to be matched. Statements (A,B,C,D) in **column I** have to be matched with statements (p, q, r, s) in **column II**.

Q.1 Match the column –

Column I	**Column II**
(A) abscissa	(p) x
(B) ordinate	(q) y
(C) coordinate	(r) x, y
(d) origin	(s) 0

Q.2 Column II give quadrant for points given in column I, match them correctly.

Column I	**Column II**
(A) 4, 4	(p) I quadrant
(B) –3, 7	(q) II quadrant
(C) 2, –3	(r) III quadrant
(D) –1, –3	(s) IV quadrant

EXERCISE - 6

PREVIOUS YEAR COMPETITION PROBLEMS

Q.1 If the distance between the points (a, 2) and (3, 4) be 8, then a =

(A) $2+3\sqrt{15}$ (B) $2-3\sqrt{15}$ (C) $2\pm3\sqrt{15}$ (D) $3\pm2\sqrt{15}$

Q.2 The line x + y = 4 divides the line joining the points (–1, 1) and (5, 7) in the ratio –

(A) 2 : 1 (B) 1 : 2 (C) 1 : 2 externally (D) None of these

Q.3 If the three vertices of a rectangle taken in order are the points (2, –2), (8, 4) and (5, 7). The coordinates of the fourth vertex is–

(A) (1, 1) (B) (1, –1) (C) (–1, 1) (D) None of these

Q.4 If P (1, 2), Q (4, 6), R (5, 7) and S (a, b) are the vertices of a parallelogram PQRS, then –

(A) a = 2, b = 4 (B) a = 3, b = 4 (C) a = 2, b = 3 (D) a = 3, b = 5

Q.5 If A (3, 5), B (–3, – 4), C (7, 10) are the vertices of a parallelogram taken in the order, then the co-ordinates of the fourth vertex are –

(A) (10, 19) (B) (15, 10) (C) (19, 10) (D) (15, 19)