

NCERT Class 9 Mathematics (Ganit Manjari)

Chapter-1 Coordinate Geometry Ganit Manjiri

Alpha- MCQ

Q1. The point where the X-axis and Y-axis intersect is called the:

- A) Abscissa B) Ordinate
- C) Origin D) Quadrant

Q2. The coordinates of the origin are always:

- A) (1,1) B) (0,0)
- C) (0,1) D) (1,0)

Q3. The horizontal line in a Cartesian plane is known as the:

- A) Y-axis B) X-axis C) Origin D) Quadrant

Q4. The vertical line in a Cartesian plane is known as the:

- A) X-axis B) Y-axis C) Abscissa D) Ordinate

Q5. Another name for the x-coordinate of a point is:

- A) Ordinate B) Abscissa C) Origin D) Axis

Q6. Another name for the y-coordinate of a point is:

- A) Abscissa B) Origin C) Ordinate D) Quadrant

Q7. In which quadrant do both x and y coordinates have positive values?

- A) Quadrant I B) Quadrant II C) Quadrant III D) Quadrant IV

Q8. A point with a negative x-coordinate and a positive y-coordinate lies in:

- A) Quadrant I B) Quadrant II C) Quadrant III D) Quadrant IV

Q9. If both coordinates of a point are negative, the point lies in:

A) Quadrant I B) Quadrant II C) Quadrant III D) Quadrant IV

Q10. In which quadrant does the point $(3, -5)$ lie?

A) Quadrant I B) Quadrant II C) Quadrant III D) Quadrant IV

Q11. Any point lying on the X-axis will have its y-coordinate equal to:

A) 1 B) -1 C) 0 D) Any number

Q12. Any point lying on the Y-axis will have its x-coordinate equal to:

A) 0 B) 1 C) -1 D) Infinity

Q13. The point $(0, 7)$ lies on:

A) The X-axis B) The Y-axis C) Quadrant I D) Quadrant II

Q14. The point $(-4, 0)$ lies on:

A) The negative Y-axis B) The positive X-axis

C) The negative X-axis D) Quadrant III

Q15. The perpendicular distance of the point $(4, 3)$ from the X-axis is:

A) 4 units B) 3 units C) 7 units D) 5 units

Q16. The perpendicular distance of the point $(-2, 6)$ from the Y-axis is:

A) 6 units B) -2 units C) 2 units D) 4 units

Q17. The Cartesian plane is divided by the axes into how many parts?

A) 2 parts B) 3 parts C) 4 parts D) 6 parts

Q18. If the abscissa of a point is y and the ordinate is x, the point is written as:

A) (x, y) B) (y, x) C) $(x, 0)$ D) $(0, y)$

Q19. The signs of the coordinates of a point in Quadrant II are:

- A) (+,+) B) (-,-) C) (-,+) D) (+,-)

Q20. What is the distance of the point (0, -3) from the origin?

- A) -3 units B) 0 units C) 3 units D) 9 units

Alpha Subjective

Q1. Find the distance of the point P(4, -3) from the origin.

Q2. In which quadrant does the point (-5, 7) lie? State the sign convention for that quadrant.

Q3. Find the distance between the points A(2, 3) and B(5, 7).

Q4. Write the coordinates of a point which lies on the x-axis and is at a distance of 6 units to the left of the y-axis.

Q5. If the distance between the points (3, a) and (4, 1) is square root of 10, find the value of a.

Q6. What is the perpendicular distance of the point P(-4, -6) from the y-axis?

Q7. Find the coordinates of the midpoint of the line segment joining the points (2, 4) and (6, 8).

Q8. Write the abscissa and the ordinate of the point (-8, -9).

Q9. Find the distance between the points P(a, b) and Q(-a, -b).

Q10. If the midpoint of the line segment joining (3, 4) and (k, 7) is (5, 5.5), find the value of k.

Q11. State whether the point (0, -5) lies on the x-axis or the y-axis.

Give a reason.

Q12. Find the perimeter of a triangle with vertices $(0, 0)$, $(3, 0)$, and $(0, 4)$.

Q13. Find the distance between the parallel lines representing points $A(0, 5)$ and $B(0, -3)$.

Q14. If the distance of the point $(x, 4)$ from the origin is 5 units, find the value of x .

Q15. Name the type of triangle formed by the points $A(0, 6)$, $B(0, 0)$, and $C(8, 0)$.

Q16. Find the coordinates of the point which is equidistant from the points $A(3, 0)$ and $B(-3, 0)$ and lies on the y -axis.

Q17. Find the distance between the points $(\cos \theta, \sin \theta)$ and $(0, 0)$.

Q18. Show that the points $(1, 1)$, $(2, 2)$, and $(3, 3)$ are collinear using the distance formula method.

Q19. Find the value of y if the distance between the points $A(2, -3)$ and $B(10, y)$ is 10 units.

Q20. What is the distance between the points $(a + b, c - d)$ and $(a - b, c + d)$?

Beta MCQ

Q1. The distance between the points A(2, -3) and B(2, 5) is:

- A) 4 units B) 8 units C) $\sqrt{8}$ units D) 10 units

Q2. If the distance between the points (x, 2) and (3, 4) is 2 units, then the value of x is:

- A) 0 B) 2 C) 3 D) 4

Q3. The coordinates of the midpoint of the line segment joining the points P(-2, 8) and Q(-6, -4) are:

- A) (-4, 2) B) (-4, 4) C) (2, -4) D) (-2, 2)

Q4. A line segment joining A(1, 3) and B(4, 6) is divided by the Y-axis in the ratio:

- A) 1:4 internally B) 1:4 externally
C) 3:1 externally D) The line segment does not intersect the Y-axis

Q5. The perimeter of a triangle with vertices (0, 4), (0, 0), and (3, 0) is:

- A) 5 units B) 7 units C) 12 units D) 15 units

Q6. If the vertices of a triangle are (0, 0), (4, 0), and (0, 3), then the area of the triangle is:

- A) 5 sq. units B) 6 sq. units C) 12 sq. units D) 24 sq. units

Q7. If the points (1, 2), (0, 0), and (a, b) are collinear, then the relation between a and b is:

- A) $a = 2b$ B) $b = 2a$ C) $a + b = 0$ D) $a = b$

Q8. The point which divides the line segment joining (1, 3) and (2, 7) in the ratio 3:4 internally lies in which quadrant?

A) Quadrant I B) Quadrant II C) Quadrant III D) Quadrant IV

Q9. If the distance of the point (x, y) from the origin is always 5 units, which of the following equations represents this relationship?

A) $x + y = 5$ B) $x^2 + y^2 = 5$ C) $x^2 + y^2 = 25$ D) $x^2 - y^2 = 25$

Q10. The coordinates of the point which is equidistant from the three vertices of a right-angled triangle $O(0,0)$, $A(6,0)$, and $B(0,8)$ are:

A) (3, 4) B) (4, 3) C) (2, 2) D) (3, 3)

Q11. The coordinates of the centroid of a triangle whose vertices are $(-1, 0)$, $(5, -2)$, and $(8, 2)$ are:

A) (12, 0) B) (4, 0) C) (0, 4) D) (4, 2)

Q12. If the midpoint of the line segment joining $A(3, 4)$ and $B(k, 6)$ is $(x, 5)$ and $x + y = 10$ (where y is the y -coordinate of the midpoint), then the value of k is:

A) 3 B) 5 C) 7 D) 9

Q13. The area of a rhombus whose vertices taken in order are $(3, 0)$, $(4, 5)$, $(-1, 4)$, and $(-2, -1)$ is:

A) 12 sq. units B) 24 sq. units C) 30 sq. units D) 48 sq. units

Q14. The ratio in which the line segment joining $P(-3, 10)$ and $Q(6, -8)$ is divided by the point $(-1, 6)$ is:

A) 2:7 B) 7:2 C) 2:3 D) 3:5

Q15. If the coordinates of one end of a diameter of a circle are $(2, 3)$ and the coordinates of its center are $(-2, 5)$, then the coordinates of the other end of the diameter are:

A) $(-6, 7)$ B) $(0, 8)$ C) $(6, -7)$ D) $(-2, 4)$

Q16. The points A(-4, -1), B(-2, 4), C(4, 0), and D(2, -5) are the vertices of a:

- A) Square B) Rectangle C) Rhombus D) Trapezium

Q17. If the area of the triangle formed by the points (x, 2x), (-2, 6), and (3, 1) is 5 square units, then the value of x can be:

- A) 2 B) $\frac{2}{3}$ C) 3 D) 5

Q18. The distance of the point P(-6, 8) from the origin is:

- A) 8 units B) $\sqrt{7}$ units C) 10 units D) 6 units

Q19. If the points A(6, 1), B(8, 2), C(9, 4), and D(p, 3) are the vertices of a parallelogram, taken in order, the value of p is:

- A) 6 B) 7 C) 8 D) 9

Q20. The point on the X-axis which is equidistant from (-1, 0) and (5, 0) is:

- A) (0, 0) B) (2, 0) C) (3, 0) D) (4, 0)

Beta Subjective

1. If the coordinates of a point P are (a, b) such that $ab > 0$ and $a + b < 0$, in which quadrant does the point P lie?
2. Find the distance of the point P(-6, 8) from the origin.
3. A point whose abscissa is -3 and ordinate is 4 lies in which quadrant? Also, find its perpendicular distance from the y-axis.
4. If the perpendicular distance of a point P from the x-axis is 5 units and the foot of the perpendicular lies in the negative direction of the x-axis, what are all the possible coordinates of point P?
5. Three vertices of a rectangle are (3, 2), (-2, 2), and (-2, -5). Find the coordinates of the fourth vertex.

6. Find the area of the triangle formed by joining the points A(0, 4), B(0, 0), and C(6, 0).
7. A point Q lies on the x-axis at a distance of 7 units to the left of the origin. What are the coordinates of Q?
8. If the coordinates of two points are A(3, 4) and B(-2, 5), then find the value of:
(Abscissa of A) - (Ordinate of B)
9. Plotting the points P(-1, 0), Q(4, 0), and R(1, 3) on a graph sheet, name the geometric figure formed by joining them in order and find its area.
10. If the point M($2x - 3$, $3x - 10$) lies in the third quadrant, find the range of integral values that x can take.
11. A line segment is drawn parallel to the y-axis at a distance of 4 units to its right. If a point K lies on this line and has an ordinate of -3, what are its coordinates?
12. State the quadrant or axis on which the following points lie without plotting them: A(0, -5) B(-3, -2) C(4, -1)
13. The ordinate of a point is twice its abscissa. If the point lies in the third quadrant and its distance from the y-axis is 3 units, find the coordinates of the point.
14. If the points A(2, 0), B(-2, 0), C(-2, 3), and D(2, 3) are joined in order, name the quadrilateral formed and find its perimeter.
15. Find the coordinates of a point which is equidistant from the points A(3, 0), B(-3, 0), and C(0, 4).
16. Write the coordinates of the vertices of an equilateral triangle of side 2a units such that its base lies on the x-axis and the origin is the midpoint of the base. (Assume the third vertex lies above the x-axis).
17. A point is at a distance of 4 units from the x-axis and 3 units from the y-axis. If it is located in the fourth quadrant, write its coordinates.
18. Find the area of the mirror image of the triangle formed by O(0,0), A(4,0), and B(0,5) when reflected across the y-axis.
19. If the coordinates of a point are given by ($t-2$, $2t+1$), find the coordinates of the point when it lies directly on the y-axis.

20. A square ABCD has its center at the origin $O(0,0)$ and its sides are parallel to the coordinate axes. If the coordinates of one vertex A are $(3, 3)$, find the coordinates of the remaining vertices B, C, and D in counter-clockwise order.

Delta MCQ

Q1. 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 the x-axis, then the point P can lie in:

- (A) Quadrant I or II
- (B) Quadrant II or III
- (C) Quadrant III or IV
- (D) Quadrant I or IV

Q2. A line segment AB of fixed length 10 units slides such that its ends A and B always lie on the x-axis and y-axis respectively. If A is at $(6, 0)$ and B is on the positive y-axis, the coordinates of B are:

- (A) $(0, 8)$
- (B) $(0, -8)$
- (C) $(0, 4)$
- (D) $(0, 10)$

Q3. Three vertices of a rectangle are $(3, 2)$, $(-2, 2)$, and $(-2, -5)$. The coordinates of the fourth vertex are:

- (A) $(3, -5)$
- (B) $(3, 5)$

(C) $(-3, -5)$

(D) $(-3, 5)$

Q4. If the coordinates of two points are $A(-3, 4)$ and $B(-2, -5)$, then (abscissa of A) - (ordinate of B) is equal to:

(A) -1

(B) 1

(C) 2

(D) -8

Q5. The area of the triangle formed by cutting the axes with the line passing through the points $(0, 6)$ and $(4, 0)$ is:

(A) 24 sq. units

(B) 12 sq. units

(C) 10 sq. units

(D) 6 sq. units

Q6. The points $(-5, 2)$ and $(2, -5)$ lie in which quadrants respectively?

(A) Quadrant II and Quadrant III

(B) Quadrant II and Quadrant IV

(C) Quadrant IV and Quadrant II

(D) Quadrant III and Quadrant IV

Q7. If $P(a, b)$ is a point such that $ab > 0$ and $a + b < 0$, then the point P must lie in:

(A) Quadrant I

(B) Quadrant II

(C) Quadrant III

(D) Quadrant IV

Q8. A square ABCD has its center at the origin (0, 0) and its sides are parallel to the coordinate axes. If the coordinates of vertex A are (3, 3), the coordinates of vertex C opposite to A are:

- (A) (-3, 3)
- (B) (3, -3)
- (C) (-3, -3)
- (D) (0, -3)

Q9. The mirror image of the point (-4, -7) with respect to the y-axis is:

- (A) (-4, 7)
- (B) (4, -7)
- (C) (4, 7)
- (D) (-7, -4)

Q10. The distance of the point P(-6, 8) from the origin (0,0) is:

- (A) 6 units
- (B) 8 units
- (C) 10 units
- (D) 14 units

Q11. If a point lies on the line $y = -x$ and its abscissa is -4, then its ordinate is:

- (A) -4 (B) 4 (C) 0 (D) 2

Q12. The perpendicular distance of the point P(4, 3) from the y-axis is:

- (A) 4 units (B) 3 units (C) 5 units (D) 7 units

Q13. If the coordinates of a point are (x, y) and it satisfies the condition $x^2 + y^2 = 0$, then the point lies on:

- (A) x-axis (B) y-axis (C) The Origin (D) Quadrant I

Q14. The area of an equilateral triangle whose one vertex is at the origin (0,0), second vertex is at (4, 0), and the third vertex lies in Quadrant I is:

- (A) $4\sqrt{3}$ sq. units (B) $8\sqrt{3}$ sq. units
(C) $16\sqrt{3}$ sq. units (D) $2\sqrt{3}$ sq. units

Q15. If the points A(0, 0), B(3, 0), and C(0, k) form a triangle of area 6 square units, then the positive value of k is:

- (A) 2 (B) 3 (C) 4 (D) 6

Q16. A point whose abscissa is equal to its ordinate and which is at a distance of $5\sqrt{2}$ units from the origin in Quadrant III has the coordinates:

- (A) (5, 5) (B) (-5, 5) (C) (5, -5) (D) (-5, -5)

Q17. The linear equation representing a line parallel to the x-axis and at a distance of 3 units below the x-axis is:

- (A) $x = -3$ (B) $y = -3$ (C) $y = 3$ (D) $x = 3$

Q18. If the line passing through the points (2, 3) and (2, -9) is drawn on a Cartesian plane, this line will be:

- (A) Parallel to the x-axis
(B) Parallel to the y-axis
(C) Passing through the origin
(D) Making a 45° angle with both axes

Q19. The perimeter of a triangle whose vertices are (0,0), (4,0), and (0,3) is:

- (A) 7 units (B) 12 units (C) 5 units (D) 14 units

Q20. On plotting the points O(0,0), A(5,0), B(5,3), and C(0,3) and joining them in order, the geometrical figure obtained is a:

- (A) Square (B) Rhombus
(C) Rectangle (D) Trapezium

Delta Subjective

Q1. A line segment AB of fixed length c slides with its ends A and B on the positive x-axis and positive y-axis respectively. If a rectangle OAPB is completed (where O is the origin), find the algebraic relationship governing the coordinates (x, y) of the moving vertex P.

Q2. The coordinates of two opposite vertices of a square are $(-1, 2)$ and $(3, 2)$. Find the coordinates of the other two vertices.

Q3. An equilateral triangle has its base lying on the y-axis with the midpoint of the base at the origin $(0, 0)$. If the length of the side is $2a$, find the coordinates of the vertices of the triangle if it lies in the first and second quadrants.

Q4. A point $P(x, y)$ is equidistant from the points $A(5, 1)$ and $B(-1, 5)$. If the area of triangle PAB is 10 square units, determine the coordinates of point P.

Q5. If the points $A(1, 1)$, $B(-1, 5)$, and $C(x, y)$ form an isosceles right-angled triangle right-angled at A, find all possible coordinates of vertex C.

Q6. The vertices of a triangle are $A(0, 0)$, $B(4, 0)$, and $C(0, 6)$. Find the coordinates of the circumcentre of triangle ABC.

Q7. A point Q is the reflection of point $P(3, 4)$ in the line $y = x$. This point Q is then reflected in the x-axis to get the final point R. Find the coordinates of R.

Q8. Find the area of the region bounded by the lines $y = 2$, $y = 6$, $y = x$, and $y = x + 4$.

Q9. Three vertices of a parallelogram ABCD taken in order are $A(-1, -6)$, $B(2, -5)$, and $C(7, 2)$. Find the coordinates of the fourth vertex D without using the midpoint or section formula.

Q10. A ray of light originating from the point $(1, 2)$ is reflected at a point A on the x-axis and then passes through the point $(5, 3)$. Find the coordinates of the point A.

Q11. Find the coordinates of a point which is at a distance of 5 units from the origin and lies on a line parallel to the x-axis that passes through $(0, 3)$.

Q12. If the distance of a point $P(x, y)$ from the origin is twice its distance from the y-axis, derive the equation representing the locus of P in terms of x and y.

Q13. A vertex of an equilateral triangle is at the origin $(0, 0)$ and another vertex is at $(3, \sqrt{3})$. Find the coordinates of the third vertex.

Q14. Find the coordinates of the orthocentre of the triangle whose vertices are $A(0, 0)$, $B(6, 0)$, and $C(0, 8)$.

Q15. The coordinates of three vertices of a rectangle are $(2, -2)$, $(8, -2)$, and $(8, 3)$. If this rectangle is reflected across the line $y = -x$, what will be the coordinates of the vertex diagonally opposite to the reflection of $(2, -2)$?

Q16. Find the area of a pentagon whose vertices taken in clockwise order are $A(1, 3)$, $B(4, 1)$, $C(3, -2)$, $D(-2, -2)$, and $E(-3, 1)$.

Q17. A point P moves such that the sum of the squares of its distances from the coordinate axes is equal to 25. If P also lies on the line $y = x + 1$, find the exact coordinates of P.

Q18. Let $A(2, 3)$ and $B(6, 7)$ be two points. If a point P lies on the x-axis such that the perimeter of triangle PAB is minimized, find the coordinates of P.

Q19. Consider a square whose sides are parallel to the coordinate axes. If the origin is the center of the square and the area of the square is 64 square units, write the coordinates of all four vertices.

Q20. A circle has its center at (3, 4) and passes through the origin. Find the coordinates of the points where the circle intersects the coordinate axes (other than the origin).

Quantum MCQ

Q1. A line segment joining the points A(-3, 4) and B(1, 0) forms the hypotenuse of a right-angled triangle ABC. If the third vertex C lies on the x-axis, find the coordinates of C.

A) (0, 0) B) (-3, 0) C) (1, 0) D) (-4, 0)

Q2. The vertices of a triangle are given by the integral coordinates (x_1, y_1) , (x_2, y_2) , and (x_3, y_3) . Which of the following values can never represent the exact area of this triangle?

A) 0.5 B) 1.5 C) 2.3 D) 7.0

Q3. Find the area of the region bounded by the graph of the equation $|x| + |y| = 4$.

A) 8 square units B) 16 square units
C) 32 square units D) 64 square units

Q4. If the distance of a point P(x, y) from the origin is exactly half of its distance from the line $x = -4$, which geometric curve describes the locus of P?

A) Circle B) Parabola
C) Ellipse D) Hyperbola

Q5. Let A(1, 2) and B(5, 5) be two fixed points. A variable point P(x, y) moves such that the perimeter of the triangle PAB is minimized. What is the minimum possible perimeter if P must lie on the x-axis?

A) $5 + \sqrt{41}$
B) $5 + \sqrt{53}$
C) $5 + \sqrt{65}$
D) $5 + \sqrt{73}$

Q6. Three vertices of a parallelogram taken in order are (a+b, a-b), (2a+b, 2a-b), and (a-b, a+b). Find the coordinates of the fourth vertex.

A) $(-b, b)$

B) $(b, -b)$

C) $(-a, a)$

D) $(a, -a)$

Q7. If the points $(1, 2)$, $(2, 4)$, and $(t, 8)$ are collinear, determine the value of the parameter t .

A) 3

B) 4

C) 5

D) 6

Q8. A circle centered at the origin passes through the point $(5, 12)$. Which of the following points lies strictly inside this circle?

A) $(-9, 10)$

B) $(11, 7)$

C) $(13, 1)$

D) $(-5, -12)$

Q9. The coordinates of the vertices of triangle PQR are $P(-1, 3)$, $Q(3, 3)$, and $R(1, 3 + 2\sqrt{3})$. What type of triangle is PQR?

A) Isosceles right-angled triangle

B) Scalene triangle

C) Equilateral triangle

D) Obtuse-angled triangle

Q10. A point P is equidistant from the points $A(2, 3)$ and $B(6, -1)$. If the x-coordinate of P is twice its y-coordinate, find the coordinates of P.

A) $(4, 2)$

B) $(2, 1)$

C) $(6, 3)$

D) $(8, 4)$

Q11. Find the total number of points with integer coordinates (x, y) that lie strictly inside the region bounded by the axes and the line $x + y = 5$.

A) 4

B) 6

C) 10

D) 15

Q12. If the area of a triangle formed by the points $(k, 2k)$, $(3k, 0)$, and $(k, 0)$ is 12 square units, what is the value of k^2 ?

- A) 4
- B) 6
- C) 8
- D) 12

Q13. Let $O(0,0)$, $A(6,0)$, and $B(0,8)$ be the vertices of a right triangle. Find the distance from the origin O to the non-hypotenuse side-length tracker locus line representing the perpendicular distance to side AB .

- A) 2.4 units
- B) 4.8 units
- C) 5.0 units
- D) 3.6 units

Q14. A straight line passes through the points $A(2, 3)$ and $B(5, 7)$. What is the shortest distance from the origin to this line?

- A) $1/\sqrt{5}$
- B) $1/\sqrt{25}$
- C) $1/\sqrt{13}$
- D) $1/\sqrt{2}$

Q15. The vertices of a triangle are $A(0, 0)$, $B(4, 0)$, and $C(0, 6)$. The coordinates of its circumcenter are:

- A) (2, 3)
- B) (4, 3)
- C) (2, 6)
- D) (0, 0)

Q16. Find the distance between the two points on the x -axis which are at a distance of 5 units from the point $(4, 3)$.

- A) 4 units
- B) 6 units
- C) 8 units
- D) 10 units

Q17. If the reflection of the point $(3, 8)$ in the line $x = 1$ is the point P , find the coordinates of P .

A) (-1, 8)

B) (1, 8)

C) (-3, 8)

D) (-5, 8)

Q18. A square ABCD has vertices A(1, 1) and C(5, 5) as opposite diagonal ends. Find the area of this square.

A) 8 square units

B) 16 square units

C) 32 square units

D) 64 square units

Q19. Find the condition for which the three distinct points (a, 0), (0, b), and (1, 1) are collinear.

A) $a + b = 1$

B) $ab = a + b$

C) $ab = 1$

D) $a^2 + b^2 = 1$

Q20. If a point matrix tracker satisfies that the distance from (x, y) to (3, 0) is three times its distance to the y-axis, the equation of its path simplifies to:

A) $8x^2 - y^2 + 6x - 9 = 0$

B) $8x^2 + y^2 + 6x - 9 = 0$

C) $9x^2 - y^2 - 6x + 9 = 0$

D) $8x^2 - y^2 - 6x + 9 = 0$

Quantum Subjective

1. A variable line passes through the point A(3, 4) and cuts the positive x-axis at P and the positive y-axis at Q. If O is the origin, find the minimum possible area of triangle OPQ in square units.

2. A square ABCD has its vertex A at (0, 0) and vertex B at (3, 4). If the square lies entirely in the first quadrant, find the sum of the coordinates of vertex C.

3. Let $P(x, y)$ be a point in the coordinate plane such that x and y are integers. If the distance from P to the origin is exactly 25, how many such points P exist?
4. Find the area of the region enclosed by the graph of the equation $|x| + |y| = 5$ in the coordinate plane.
5. A triangle has vertices at $A(0, 0)$, $B(6, 0)$, and $C(0, 8)$. A point $P(x, y)$ inside the triangle is equidistant from all three sides. Find the value of $x + y$.
6. The points $A(a, 0)$, $B(0, b)$, and $C(1, 1)$ are collinear. Find the value of the expression $\frac{1}{a} + \frac{1}{b}$.
7. The point $A(2, 3)$ is reflected across the line $y = x$ to get point B . Point B is then reflected across the x -axis to get point C . Find the square of the distance between A and C .
8. A circle passes through the points $O(0, 0)$, $A(6, 0)$, and $B(0, 8)$. Find the coordinates of the center of this circle.
9. Consider three points $A(1, 2)$, $B(3, 8)$, and $C(k, 5)$. If the area of triangle ABC is 0, find the value of k .
10. A point $P(x, y)$ satisfies the condition: square root of $((x-3)^2 + (y-4)^2) +$ square root of $(x + 3)^2 + (y + 4)^2 = 10$. Find the total length of the locus traced by point P .
11. Three vertices of a parallelogram $ABCD$ taken in order are $A(-1, 2)$, $B(2, 5)$, and $C(6, 3)$. Find the coordinates of the fourth vertex D .
12. Find the distance between the parallel lines $3x + 4y = 12$ and $3x + 4y = 27$.

13. The area of a triangle whose vertices are (a, a) , $(a+1, a+3)$, and $(a+2, a)$ is constant. Find this area in square units.
14. Let $A(0, 10)$ and $B(8, 2)$ be two points. Find the coordinates of a point P on the y -axis such that the perimeter of triangle PAB is minimized.
15. Find the area of the polygon formed by connecting the coordinates $(0,2)$, $(3,5)$, $(7,5)$, $(9,2)$, $(7,-1)$, and $(3,-1)$ in order.
16. A line segment AB of fixed length L slides with its ends A and B on the x -axis and y -axis respectively. Find the locus equation traced by the midpoint of AB .
17. The vertices of a triangle are $A(0, 0)$, $B(4, 0)$, and $C(2, 2\sqrt{3})$. Find the coordinates of its circumcenter.
18. Find the number of integral points (points with both coordinates as integers) that lie strictly inside the triangle formed by the points $(0,0)$, $(0,5)$, and $(5,0)$.
19. A point $P(a, b)$ is reflected across the y -axis to P_1 , and P_1 is reflected across the line $y = -x$ to P_2 . If the coordinates of P_2 are $(4, -3)$, find the value of $a^2 + b^2$.
20. A rectangle has sides parallel to the coordinate axes. Two of its diagonally opposite vertices are $(-2, 3)$ and $(6, -3)$. Find the perimeter of this rectangle.

ANSWERS

Answer Key

LOD 1:

Q1-C, Q2-B, Q3-B, Q4-B, Q5-B, Q6-C, Q7-A, Q8-B, Q9-C, Q10-D, Q11-C, Q12-A, Q13-B, Q14-C, Q15-B, Q16-C, Q17-C, Q18-B, Q19-C, Q20-C |

VSA

Q1 Answer: 5 units Q2 Answer: Second Quadrant (Quadrant II), Sign convention: $(-, +)$ Q3 Answer: 5 units Q4 Answer: $(-6, 0)$ Q5 Answer: $a = -2$ or $a = 4$ Q6 Answer: 4 units

Q7 Answer: $(4, 6)$ Q8 Answer: Abscissa = -8 , Ordinate = -9

Q9 Answer: $2 \times \text{square root of } (a^2 + b^2)$ units Q10 Answer: $k = 7$

Q11 Answer: y-axis, because its x-coordinate (abscissa) is 0

Q12 Answer: 12 units Q13 Answer: 8 units

Q14 Answer: $x = 3$ or $x = -3$ Q15 Answer: Right-Angled Triangle

Q16 Answer: $(0, 0)$ Q17 Answer: 1 unit

Q18 Answer: Collinear, since $AB + BC = AC$ (square root of 2 + square root of 2 = $2 \times \text{square root of } 2$) Q19 Answer: $y = 3$ or $y = -9$

Q20 Answer: $2 \times \text{square root of } (b^2 + d^2)$ units

LOD 2:

Q1-B, Q2-C, Q3-A, Q4-D, Q5-C, Q6-B, Q7-B, Q8-A, Q9-C, Q10-A, Q11-B, Q12-C, Q13-B, Q14-A, Q15-A, Q16-B, Q17-B, Q18-C, Q19-B, Q20-B

LSA

1. Third quadrant (III) 2. 10 units 3. Second quadrant (II);

Perpendicular distance = 3 units 4. $(-5, 5)$ or $(-5, -5)$ 5. $(3, -5)$ 6. 12 square units

7. $(-7, 0)$ 8. -2 9. Triangle; Area = 7.5 square units

10. $x = 2$ (Since $1.5 < x < 3.33$) 11. $(4, -3)$

12. A lies on the negative y-axis; B lies in Quadrant III; C lies in Quadrant IV

13. $(-3, -6)$ 14. Rectangle; Perimeter = 14 units 15. $(0, 0)$ - Origin

16. $(-a, 0)$, $(a, 0)$, and $(0, \sqrt{3} * a)$ 17. $(3, -4)$
 18. 10 square units 19. $(0, 5)$ 20. $B(-3, 3)$, $C(-3, -3)$, $D(3, -3)$

LOD 3

1. B, 2. A, 3. A, 4. C, 5. B, 6. B, 7. C, 8. C, 9. B, 10. C, 11. B, 12. A, 13. C, 14. A, 15. C,
 16. D, 17. B, 18. B, 19. B, 20. C

VLSA

1. $x^2 + y^2 = c^2$ 2. $(1, 4)$ and $(1, 0)$
 3. $(a * \sqrt{3}, 0)$, $(0, a)$, $(0, -a)$ or $(-a * \sqrt{3}, 0)$, $(0, a)$, $(0, -a)$
 4. $(2, 5)$ or $(4, -1)$ 5. $(5, 3)$ or $(-3, -1)$ 6. $(2, 3)$ 7. $(4, -3)$
 8. 16 square units 9. $(4, 1)$ 10. $(13/5, 0)$
 11. $(4, 3)$ and $(-4, 3)$ 12. $3x^2 - y^2 = 0$
 13. $(0, 2 * \sqrt{3})$ or $(3, -\sqrt{3})$ 14. $(0, 0)$
 15. $(-3, -8)$ 16. 22.5 square units 17. $(3, 4)$ and $(-4, -3)$ 18.
 $(4.4, 0)$ or $(22/5, 0)$ 19. $(4, 4)$, $(-4, 4)$, $(-4, -4)$, $(4, -4)$
 20. $(6, 0)$ on the x-axis and $(0, 8)$ on the y-axis

LOD 4

- Q1: B) Q2: C) Q3: C) Q4: C) Q5: B) Q6: A) Q7: B) Q8: B) Q9: C) Q10: A) Q11: B) Q12:
 B) Q13: B) Q14: A) Q15: A) Q16: C) Q17: A) Q18: B) Q19: B) Q20: A)

VVLSA

1. 24 2. 6 3. 20 4. 50 5. 4 6. 1 7. 26
 8. $(3, 4)$ 9. 2 10. 10 11. $(3, 0)$ 12. 3 13. 3
 14. $(0, 2)$ 15. 36 16. $x^2 + y^2 = (L^2) / 4$ 17. $(2, 2/\sqrt{3})$
 18. 6 19. 25 20. 28

Q1. Find the coordinates of a point on the x-axis which is equidistant from the points $A(2, -5)$ and $B(-2, 9)$.

Q2. Check whether the points (5, -2), (6, 4), and (7, -2) form the vertices of an isosceles triangle. Show your working clearly.

Q3. Find a relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(3, 6)$ and $B(-3, 4)$.

Q4. If the point $P(x, y)$ is equidistant from the points $A(a + b, b - a)$ and $B(a - b, a + b)$, prove that $bx = ay$.

Q5. The center of a circle is $C(2a, a - 7)$. Find the values of ' a ' if the circle passes through the point $P(11, -9)$ and has a radius of $5\sqrt{2}$ units.

Q6. Show that the points $A(1, 7)$, $B(4, 2)$, $C(-1, -1)$, and $D(-4, 4)$ are the vertices of a square.

Q7. Find the values of y for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10 units. Verify your coordinates by stating which quadrants the possible positions of Q lie in.

Q8. A line segment is of length 13 units and one of its ends is at the point $(-2, 3)$. If the ordinate of the other end is 8, find its possible abscissae.

Q9. Prove that the points $A(2, 3)$, $B(4, 7)$, and $C(0, -1)$ are collinear using the distance formula.

Q10. Find the perimeter of a triangle whose vertices are given by the coordinates $A(-2, 1)$, $B(4, 1)$, and $C(1, 5)$.

Q11. Find the coordinates of the center of a circle passing through the points $O(0, 0)$, $A(6, 0)$, and $B(0, 8)$.

Q12. If the vertices of a parallelogram taken in order are $A(1, 2)$, $B(4, y)$, $C(x, 6)$, and $D(3, 5)$, find the values of x and y using the midpoint property of diagonals.

Q13. Show that the points $A(3, 0)$, $B(6, 4)$, and $C(-1, 3)$ are the vertices of an isosceles right-angled triangle. Which vertex holds the right angle?

Q14. Find the coordinates of the points which trisect the distance between the origin and the point (9, -12) using successive midpoint properties.

Q15. If the points A(a, 0), B(0, b), and C(1, 1) are collinear, prove that $(1/a) + (1/b) = 1$. (Use the condition that $AB + BC = AC$ or property of slopes/distances).

Q16. Find the distance between the points $P(at_1^2, 2at_1)$ and $Q(at_2^2, 2at_2)$ if it is given that t_1 and t_2 are the roots of the equation $x^2 - 5x + 6 = 0$, and $a = 1$.

Q17. The vertices of a triangle are A(1, 1), B(5, 1), and C(3, 5). If M is the midpoint of AB and N is the midpoint of AC, find the length of MN and show that $BC = 2 * MN$.

Q18. Determine if the point P(3, 3) lies inside, outside, or on the circle whose center is at the origin and which passes through the point (0, 4).

Q19. Find a point on the y-axis which is equidistant from the points A(6, 5) and B(-4, 3).

Q20. An equilateral triangle has two vertices at (0, 0) and (3, square root of 3). Find the coordinates of the third vertex assuming it lies completely in the first quadrant.