Coordinate Geometry

- If P(x₁,y₁) and Q(x₂,y₂) be any two points in the plane, then $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
- If A(x₁,y₁), B(x₂,y₂) and C(x₃,y₃) be the vertices of a triangle, then area, D, of triangle ABC is given by $\frac{1}{2} [x_1(y_2 y_3) + x_2(y_3 y_1) + x_3(y_1 y_2)]$
- The points A, B and C are collinear if and only if area of triangle ABC is zero.
- A point R is said to divide PQ internally in the ratio m : n if R is PQ and $\frac{PR}{RQ} = \frac{m}{n}$.
- If R(x,y) divides the join of P(x₁,y₁) and Q(x₂,y₂) internally in the ratio m : n, $x = \frac{m \times 2 + n \times 1}{m + n}, \quad y = \frac{m y_2 + n y_1}{m + n}.$
- If M (x,y) is the midpoint of the join of P (x_1,y_1) and Q (x_2,y_2) ,

then
$$X = \frac{X_1 + X_2}{2}$$
, $Y = \frac{Y_1 + Y_2}{2}$.

MCQ:

1) Point A(-5 , 6) is at a distance of		
a) $\sqrt{61}$ units from origin	b) √11	units from origin
c) 61 units from origin	d) 11	units from origin

2) If the points (1, x), (5, 2) and (9, 5) are collinear, then the value of x is

3) The end points of diameter of a circle are (2, 4) and (-3, -1). The radius is

a) $5\sqrt{2}/2$ b) $3\sqrt{2}$ c) $5\sqrt{2}$ d) $\pm 5\sqrt{2}/2$

4) The ratio in which the x axis divides the line segment joining (5,4) and (2,-3) is

a) 5:2 b) 3:4 c) 2:5 d) 4:3

- 5) The point which divides the line segment joining the points (7, -6) and (3,4) in the ratio 1 :2 lies in the
 - a) I quadrant b) II quadrant c) III quadrant d) IV quadrant

6) The point which lies on the perpendicular bisector of the line segment joining the points A (-2, -5) and B (2,5) is

a) (0,0) b) (2,0) c) (0,2) d) (-2,0)

- 7) The fourth vertex D of a parallelogram ABCD whose three vertices are A (-2,3) , B (6,7) and C(8, 3) is
 - a) (0,1) b) (0,-1) c) (-1,0) d) (1,0)
- 8) If the point P(2,1) lies on the line segment joining points A(4,2) and B(8,4) then

a) AP = 1/3 AB b) AP = PB c) PB = 1/3AB d) AP = 1/2 AB

9) The area of a triangle whose vertices are (5,0), (8,0) and (8,4) (in sq. units) is

a) 20 b) 12 c) 6 d) 16

10) If A (1,3), B(-1, 2), C (2,5) and D(x, 4) are the vertices of a parallelogram ABCD,

then the value of x is

a) 3 b) 4 c) 0 d) 3/2

11) If the distance between the points (4, c) and (1,0) is 5, then c = 0

a) ± 4 b) ± 3 c) ± 2 d) 0

12) The point $(-1, \frac{1}{2})$ lies in the _____ quadrant.

a) 1^{st} b) 2^{nd} c) 3^{rd} d) 4^{th}

Short and Long answers:

- 1. The mid-point of the line segment joining the points (-4a + 4, 5) and (b, b 1) is (-2, b). Find the values of a and b.
- 2. Show that the points (2, 5), (-1, 2), (0, 5), and (3, 8) are the vertices of a parallelogram
- 3. The point (a, b) is equidistant from the points (-2, 6) and (-3, -4). Find a relation between a and b.
- 4. The distance between two points P and Q is 6 units. The coordinates of point P are (4, -6). Find the coordinates of point Q, if the ordinate of Q is thrice its abscissa.
- 5. If W (-1, 0), X (-3, -4), Y (-2, -4), and Z (1, 2) are the vertices of a quadrilateral, then find the area of quadrilateral
- 6. Show that the points P (0, -5), Q (6, 1), R (3, 4), and S (-3, -2) are the vertices of a rectangle
- 7. The centre of a circle is (2x 1, 3x + 1). Find x if the circle passes through (-3,-1) and the length of the diameter is 20 units.
- 8. If two vertices of an equilateral triangle are (0, 0) and (3, 0), find the third vertex.
- 9. Find the ratio in which the line segment joining the points (1, -3) and (4,5) is divided by x axis.

10. The coordinates of the centre of a circle of radius 13 cm are O (1, -5). Also, OX is perpendicular to the chord AB. The coordinates of X are (-3, -2). Find the lengths of AX and AB.



- 11. Find the ratio in which the y axis divides the line segment joining the points (5, -6) and (-1, -4). Also find the coordinates of the point of intersection
- 12. Find the value of y for which the points (5,-4), (3, -1) and (1,y) are collinear.
- 13. Find the area of a quadrilateral ABCD whose vertices are A (-4,2), B(-3,-5), C(3, -2) and D (2,3)
- 14. If A(-1,3), B(1,-1) and C(5,1) are the vertices of a triangle ABC, find the length of the median through A.
- 15. Find the value of k if the point P (0,2) is equidistant from Q(3,k) and R(k,5)
- 16. Determine the ratio in which the line 3x + y 9 = 0 divides the line segment joining the points (1,3) and (2,7)
- 17. If the mid point of the line segment joining the points A(3,4) and B(k,6) is P (x,y) and x + y 10 = 0, find k.
- 18. If (a,0), (0,b) and (1,1) are collinear prove that $\frac{1}{a} + \frac{1}{b} = 1$
- 19. If R (x, y) is a point on the line segment joining the points P(a,b) and Q (b,a) , then prove that x + y = a + b
- 20. Point P divides the line segment joining the points A (2,1) and B(5, -8) such that $\frac{AP}{AB} = \frac{1}{3}$. If P lies on 2x y + k = 0, find the value of k.
- 21. Prove that the points A (-3,0), B(1, -3) and C (4,1) are the vertices of an isosceles right triangle.
- 22. In what ratio does the point P (2,-5) divide the line segment joining A (-3,5) and B (4,-9) ?
- 23. Find a point on the y axis which is equidistant from the points A (6,5) and B(-4,3)
- 24. Show that P(1,-1) is the centre of the circle circumscribing the triangle whose vertices are A (4,3), B(-2,3) and C(6,-1)
- 25. If A (3,0), B(4,5), C(-1,4) and D (-2,-1) are four points in a plane, show that ABCD is a rhombus but not a square.
- 26. The ends of a diagonal of a square have the coordinates (a,1) and (-1,a). Find a if the area of the square is 50 sq.units.
- 27. ABCD is a parallelogram whose vertices A and B have the coordinates (2,-3) and (-2,1) respectively. The diagonals of the parallelogram meet at the origin. Find the perimeter of ABCD.