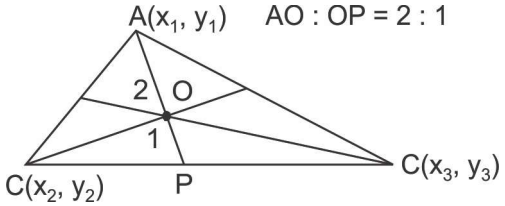
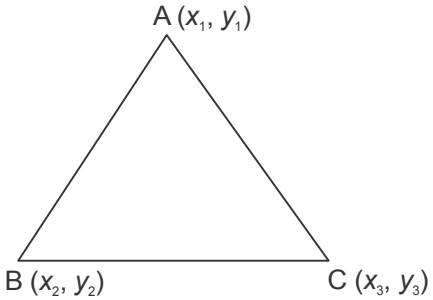
6. ***Centroid of a triangle is given by :***



$$O\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

7. The area of ΔABC, where $A(x_1, y_1)$, $B(x^2, y^2)$, (x^3, y^3) are its vertices

$$\text{ar } (\Delta) = \frac{1}{2} [x_1 (y_2 - y_3) + x_2 (y_3 - y_1) + x_3 (y_1 - y_2)] \text{ sq. units}$$



8. If area of a triangle is zero then points are collinear and vice versa.

VERY SHORT ANSWER TYPE QUESTIONS

Fill in the blanks :

1. The distance of a point from the y-axis is called its x-coordinate or _____ .

2. The distance of a point from the x-axis is called its _____ or ordinate.

3. The point (5, 0) lies on ____ axis.

4. A point which lies on y-axis are of the form _____ .

5. A linear equation of the form $ax + by + c = 0$ when represented graphically gives a _____ .

6. The distance of a point $P(x, y)$ from the origin is _____

Multiple Choice Question :

7. P is a point on x-axis at a distance of 3 unit from y-axis to its left. The co-ordinates of P are :

(*a*) (3, 0) (*b*) (0, 3)

(*c*) (– 3, 0) (*d*) (0, – 3)

8. The distance of $P(3, -2)$ from y-axis is

(*a*) 3 units (*b*) 2 units

(*c*) – 2 units (*d*) $\sqrt{13}$ units

9. The co-ordinates of two ponts are (6, 0) and (0, – 8). The co-ordinates of the mid points are

(*a*) (3, 4) (*b*) (3, – 4)

(*c*) (0, 0) (*d*) (– 4, 3)

10. If the distance between $P(4, 0)$ and $Q(0, x)$ is 5 units, the value of x will be

(*a*) 2 (*b*) 3

(*c*) 4 (*d*) 5

11. The co-ordinates of the point where line $\frac{x}{a}+\frac{y}{b}=7$ intersects y-axis are

(*a*) $(a, 0)$ (*b*) $(0, b)$

(*c*) $(0, 7b)$ (*d*) $(2a, 0)$

12. The area of triangle OAB, the co-ordinates of whose vertices are A(4, 0), B(0, – 7) and O origin, is :

(*a*) 11 sq. units (*b*) 18 sq. units

(*c*) 28 sq. units (*d*) 14 sq. units

13. The distance between the points $P\left(-\frac{11}{3}, 5\right)$ and $Q\left(-\frac{2}{3}, 5\right)$ is

(*a*) 6 units (*b*) 4 units

(*c*) 3 units (*d*) 2 units

14. The distance between the points (5 cos 35°, 0) and (0, 5 cos 55°) is

(*a*) 10 units (*b*) 5 units

(*c*) 1 unit (*d*) 2 units

15. The co-ordinates of vertex A of ΔABC are $(-4, 2)$ and a point D which is mid point of BC are $(2, 5)$. The coordinates of centroid of ΔABC are

(a) $(0, 4)$ (b) $\left(-1, \frac{7}{2}\right)$

(c) $\left(-2, \frac{7}{3}\right)$ (d) $(0, 2)$

16. The distance between the line $2x + 4 = 0$ and $x - 5 = 0$ is

(a) 9 units (b) 1 unit

(c) 5 units (d) 7 units

17. The perimeter of triangle formed by the points $(0, 0)$, $(2, 0)$ and $(0, 2)$ is

(a) 4 units (b) 6 units

(c) $6\sqrt{2}$ units (d) $4 + 2\sqrt{2}$ units

18. If the centroid of the triangle formed by $(9, a)$, $(b, -4)$ and $(7, 8)$ is $(6, 8)$, then the value a and b are :

(a) $a = 4, b = 5$ (b) $a = 5, b = 4$

(c) $a = 5, b = 2$ (d) $a = 20, b = 2$

VERY SHORT ANSWER TYPE QUESTIONS

19. The centre of circle having end points of its diameter as $(-4, 2)$ and $(4, -3)$ is

(a) $(2, -1)$ (b) $(0, -1)$

(c) $(0, -\frac{1}{2})$ (d) $(4, -\frac{5}{2})$ **(CBSE 2020 Basic)**

20. The distance between the points $(0, 0)$ and $(a - b, a + b)$ is

(a) $2\sqrt{ab}$ (b) $\sqrt{2a^2 + ab}$

(c) $2\sqrt{a^2 + b^2}$ (d) $\sqrt{2a^2 + 2b^2}$ **(CBSE 2020 Standard)**

SHORT ANSWER TYPE QUESTIONS-I

21. For what value of P, the points $(2, 1)$, $(p, -1)$ and $(-1, 3)$ are collinear.

22. Find the area of triangle formed by $A(0, 0)$, $B(4, 0)$ and C(0, 9)

(CBSE 2020 Basic)

23. Find the point of trisection of the line segment joining the points (1, – 2) and (– 3, 4).

24. The midpoints of the sides of a triangle are (3, 4), (4, 1) and (2, 0). Find the vertices of the triangle.

25. A circle has its centre at (4, 4). If one end of a diameter is (4, 0) then find the coordinates of the other end. **(CBSE 2020 Standard)**

26. Find the ratio in which P(4, m) divides the line segment joining the points $A(2, 3)$ and $B(6, –3)$. Hence find m. **(CBSE 2018)**

27. Show that the points (– 2, 3), (8, 3) and (6, 7) are the vertices of a right angle triangle.

28. Find the point on y-axis which is equidistant from the points (5, –2) and (–3, 2).

(CBSE 2019)

29. Find the ratio in which y-axis divides the line segment joining the points A(5, – 6) and B(– 1, – 4).

30. Find the co-ordinates of a centroid of a triangle whose vertices are (3, – 5), (– 7, 4) and (10, – 2).

31. Find the relation between x and y such that the points (x, y) is equidistant from the points (7, 1) and (3, 5).

32. Find the ratio in which the segment joining the points (1, –3) and (4, 5) is divided by x-axis. Also find the coordinates of the point on x-axis.

(CBSE 2019)

33. What is the value of a if the points (3, 5) and (7, 1) are equidistant from the point $(a, 0)$?

34. Find a relation between x and y if the points $A(x, y)$, $B(– 4, 6)$ and $C(– 2, 3)$ are collinear.

35. If the points A(2, 0), B(6, 1) and C(p, q) from a triangle of area 12 sq units (positive only) and $2p + q = 10$, then find the values of p and q.

(CBSE 2020 Standard)

36. Name the type of triangle formed by the points A(– 5, 6), B(– 4, – 2) and C(7, 5).

(NCERT Exempler)

37. Find the points on the x-axis which are at a distance of $2\sqrt{5}$ from the point (7, – 4). How many such points are there? **(NCERT Exempler)**

38. A line intersects the y-axis and x-axis at the point P and Q. If (2, –5) is the midpoint of PQ then find the co-ordinates of P and Q. **(CBSE 2017)**

39. If A(–2, 1), B(a, 0), C(4, b) and D(1, 2) are the vertices of a parallelogram ABCD, find the values of a and b. Hence find the lengths of its sides.

(CBSE 2018)

40. Let P and Q be the points of trisection of the line segment joining the points A(2, – 2) and B(– 7, 4) such that P is nearer to A. Find the co-ordinates of P and Q.

SHORT ANSWER TYPE QUESTIONS-II

41. The line segment joining the points A(2, 1) and B(5, – 8) is trisected at the point P and Q such that P is nearer to A. If P also lies on the line given by $2x – y + k = 0$, find the value of k. **(CBSE 2019)**

42. Find the ratio in which the line $x – 3y = 0$ divides the line segment joining the points (– 2, – 5) and (6, 3). Find the co-ordinates of the point of intersection.

(HOTS)

43. Point A lies on the line segment XY joining X(6, – 6) and Y(– 4, – 1) in such a way that $\frac{XA}{XY} = \frac{2}{5}$. If point A also lies on the line $3x + k(y + 1) = 0$, find the value of k.

(HOTS)

44. Find the area of the triangle formed by joining the mid points of the sides of the triangle ABC, whose vertices are A(0, – 1), B(2, 1) and C(0, 3).

45. Find the value of k so that the area of triangle ABC with $A(k + 1, 1)$, B(4, – 3) and $C(7, – k)$ is 6 square units.

46. Point P divides the line segment joining the points A(2, 1) and B(5, – 8) such that $\frac{AP}{PB} = \frac{1}{3}$. If P lies on the line $2x – y + k = 0$. Find the value of k.

47. If the distances of $P(x, y)$ from $A(5, 1)$ and $B(-1, 5)$ are equal then prove that $3x = 2y$. **(CBSE 2017)**

48. In what ratio does the point $\left(\frac{24}{11}, y\right)$ divides the line segment joining the points $P(2, -2)$ and $Q(3, 7)$? **(CBSE 2017)**

49. If $A(-3, 2)$, $B(x, y)$ and $C(1, 4)$ are the vertices of an isosceles triangle with $AB = BC$. Find the value of $(2x + y)$.

50. If the point $P(3, 4)$ is equidistant from the points $A(a + b, b - a)$ and $B(a - b, a + b)$ then prove that $3b - 4a = 0$.

LONG ANSWER TYPE QUESTIONS-III

51. Find the area of the quadrilateral ABCD whose vertices are $A(-4, -3)$, $B(3, -1)$, $C(0, 5)$ and $D(-4, 2)$. **(CBSE 2020 Standard)**

52. If $P(x, y)$ is any point on the line joining $A(a, 0)$ and $B(0, b)$ then show that $\frac{x}{a} + \frac{y}{b} = 1$.

53. If the points (x, y), $(-5, -2)$ and $(3, -5)$ are collinear, prove that $3x + 8y + 31 = 0$.

54. Find the relation between x and y if $A(x, y)$, $B(-2, 3)$ and $C(2, 1)$ form an isosceles triangle with $AB = AC$.

55. Prove that the point $\left(x, \sqrt{1 - x^2}\right)$ is at a distance of 1 unit from the origin.

56. If the points $A(k + 1, 2k)$, $B(3k, 2k + 3)$ and $C(5k - 1, 5k)$ are collinear then find the value of k. **(CBSE 2017)**

57. If the points (a, b), (c, d) and $(a - c, b - d)$ are collinear show that $bc = ad$.

58. Find the co-ordinates of the circumcenter of the triangle whose vertices are $(3, 7)$, $(0, 6)$ and $(-1, 5)$. Find the circumradius. **(HOTS)**

59. In a triangle PQR, the co-ordinates of points P, Q and R are $(3, 2)$, $(6, 4)$ and $(9, 3)$ respectively. Find the co-ordinates of centroid G. Also find the areas of ΔPQG and ΔPRG.

60. If the points $(5, 4)$ and (x, y) are equidistant from the point $(4, 5)$, prove that $x^2 + y^2 - 8x - 10y + 39 = 0$.

ANSWERS AND HINTS

VERY SHORT ANSWER TYPE QUESTIONS-I

1. abscissa

2. y-coordinate

3. x-axis

4. $(0, y)$

5. straight line

6. $\sqrt{x^2 + y^2}$

7. (*iii*) (– 3, 0)

8. (i) 3 units

9. (ii) (3, – 4)

10. (ii) 3

11. (iii) (0, 7b)

12. (iv) 14 sq. units

13. (c) 3 units

14. (b) 5 units

15. (a) (0, 4)

16. (d) 7 units

17. (d) $\left(4 + 2\sqrt{2}\right)$ units

18. (d) a = 20, b = 2

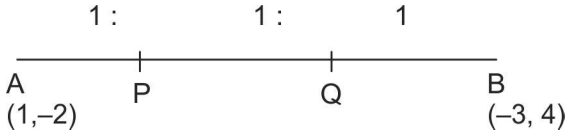
19. (c)

20. (d)

21. $P = 3$

22. 18 sq. units

23.



AP : PB = 1 : 2

AQ : QB = 2 : 1

$$P = \left(-\frac{1}{3}, 0\right)$$

$$Q = \left(-\frac{5}{3}, 2\right)$$

24. Let A(x_1, y_1), B(x_2, y_2), C(x_3, y_3) are vertices of given triangle

Let

Midpoints of AB = D(3, 4)

Midpoints of BC = E(4, 1)

Midpoints of AC = F(2, 0)

Apply Midpoint formula on AB, BC, AC

We get

$x_1 + x_2 = 6$, $y_1 + y_2 = 8$

$x_2 + x_3 = 8$, $y_2 + y_3 = 2$

$x_1 + x_3 = 4$, $y_1 + y_3 = 0$

Solving we get

$x_1 = 1$ $y_1 = 3$

$x_2 = 5$ $y_2 = 5$

$x_3 = 3$ $y_3 = -3$

$\therefore$ A(1, 3), B(5, 5), C(3, –3)

25. (4, 8)

26. Ratio 1 : 1, m = 0

27. Show using pythagoras theorem and distance formula.

28. (0, –2)

29. 5 : 1

30. (2, – 1)

31. $x - y = 2$

32. 3 : 5 ; $\left(\frac{17}{8}, 0\right)$

33. $a = 2$

34. $3x = -2y$

35. $p = 2$, $q = 6$

36. Using distance formula, scalene triangle.

37. $x = 1$, $x = -15$

Two such points are there.

38. (4, –10)

39. $a = 1$, $b = 1$, $AB = CD = \sqrt{10}$, $AD = BC = \sqrt{10}$

40. $P(-1, 0)$, $Q(-4, 2)$

41. $P(3, -2)$

Put value of $x = 3$, $y = -2$ is equation, then $k = -8$.

42. Let $P(x, y)$ be the point and $m : n$ is the ratio

then $x = \dfrac{6n - 2m}{m + n}$, $\quad y = \dfrac{3n - 5m}{m + n}$ ...(1)

From equation of line $x = 3y \Rightarrow \dfrac{x}{y} = 3$

By putting $x = 3y$ or $\dfrac{x}{y} = 3$ is (1)

$m : n = 3 : 13$

Then $P(x, y) = \left(\dfrac{9}{2}, \dfrac{3}{2}\right)$

43. Find $\dfrac{\text{XA}}{\text{AY}} = \dfrac{2}{3}$.

Let $A(x , y)$ is the point.

$x = 2$, $y = -4$

$A\ (2, -4)$

Put $x = 2$ and $y = -4$ in equation.

$\therefore\ K = 2$

44. 1 sq. unit

45. $K = 3$

46. $K = \dfrac{-17}{4}$

47. $PA = PB$, Use distance formula

48. 2 : 9

49. $2x + y = 1$

50. $3b - 4a = 0$ proved by using distance formula.

51. Area of quadrilateral = 34 sq units.

52. Prove by section formula.

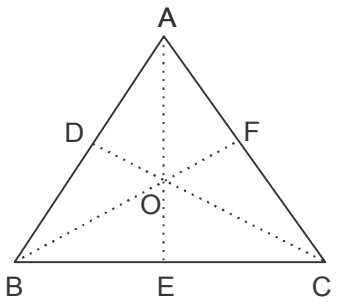
53. Prove by area of $\Delta = 0$ if points are collinear.

54. Prove by distance formula.

55. Prove by distance formula.

56. $k = \frac{1}{2}$, $k = -2$

58. Find co-ordinates of mid points of AB, BC, CA then DO = OE = OF



then (circumcentre) $O(x, y) = \left(1, \frac{13}{2}\right)$

circumradius AO = $\frac{\sqrt{17}}{2}$.

59. $G(x, y) = (6, 3)$

ar Δ PQG = $\frac{3}{2}$ sq. units

ar Δ PRG = $\frac{3}{2}$ sq. units

60. Use distance formula

PRACTICE-TEST

Coordinate Geometry

Time : 1 Hr. ***M.M. : 20***

SECTION - A

1. Find the value of m for which the points (3, 5), (m, 6) and $\left(\frac{1}{2}, \frac{15}{2}\right)$ are collinear. **1**

2. What is the distance between the points A(c, 0) and B(0, $-c$) **1**

3. The distance of point P(– 6, 8) from the origin is _____ . **1**

4. Find the value of 'a' so that the point (3, a) lies on the line segment $2x - 3y = 5$. **1**

SECTION B

5. For what value of p, the points (– 3, 9), (2, p) and (4, – 5) are collinear. **2**

6. If the points A(8, 6) and B(x, 10) lie on the circle whose centre is (4, 6) then find the value of x. **2**

7. Find the perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0). **2**

SECTION C

8. Show that the points A(–3, 2), B(– 5, –5), C(2, –3) and D(4, 4) are the vertices of a rhombus. **3**

9. Find the ratio in which the point (2, y) divides the line segment joining the points A(–2, 2) and B(3, 7). Also find the value of y. **3**

SECTION D

10. If the point P divides the line segment joining the points A(–2, –2) and B(2, – 4) such that $\frac{AP}{AB} = \frac{3}{7}$, then find the coordinate of P. 4