SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

COORDINATE GEOMETRY

Class 10 - Mathematics

Time Allowed: 3 hours **Maximum Marks: 180**

Section A

1. If end points of a diameter of a circle are (-5, 4) and (1, 0), then the radius of the circle is: **[1]**

   a) $4\sqrt{2}$ units b) $\sqrt{13}$ units

   c) $2\sqrt{13}$ units d) $2\sqrt{2}$ units

2. The distance between the points (a cos θ + b sin θ, 0) and (0, a sin θ - b cos θ), is **[1]**

   a) $\sqrt{a^2+b^2}$ b) $a^2 - b^2$

   c) $a^2 + b^2$ d) $\sqrt{a^2-b^2}$

3. The distance between the points (-1, -3) and (5, -2) is: **[1]**

   a) $\sqrt{17}$ units b) $\sqrt{37}$ units

   c) $\sqrt{61}$ units d) 5 units

4. The mid-point of the line segment joining the points A (-2, 8) and B (- 6, - 4) is **[1]**

   a) (- 4, -6) b) (4, 2)

   c) (2, 6) d) (– 4, 2)

5. The ratio in which the x-axis divides the segment joining (3, 6) and (12,-3) is **[1]**

   a) 1 : -2 b) 2 : 1

   c) 1 : 2 d) -2 : 1

6. The mid-point of the line segment joining the points (-1, 3) and (8, $\frac{3}{2}$) is: **[1]**

   a) $\left(\frac{7}{2}, -\frac{3}{4}\right)$ b) $\left(\frac{7}{2}, \frac{9}{4}\right)$

   c) $\left(\frac{7}{2}, \frac{9}{2}\right)$ d) $\left(\frac{9}{2}, -\frac{3}{4}\right)$

7. If the point P(2, 1) lies on the line segment joining points A(4, 2) and B(8, 4), then **[1]**

   a) $AP = \frac{1}{4}AB$ b) $AP = \frac{1}{2}AB$

   c) $AP = \frac{1}{3}AB$ d) AP = PB

8. The distance of the point (5, 4) from the origin is **[1]**

   a) $\sqrt{41}$ b) 41

   c) 3 d) 9

9. If three points (0,0), (3, $\sqrt{3}$) and (3, λ) form an equilateral triangle, then λ = **[1]**

   a) -4 b) None of these

c) -3 d) 2

10. The distance between the points (3, -2) and (-3, 2) is: **[1]**

a) 40 b) $4\sqrt{10}$

c) $2\sqrt{10}$ d) $\sqrt{52}$

11. If the points (6, 1), (8, 2), (9, 4) and (p, 3), taken in order are the vertices of a parallelogram, then the value of 'p' is **[1]**

a) 5 b) – 7

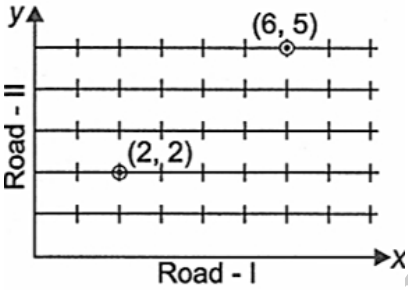
c) 6 d) 7

12. x-axis divides the line segment joining A(2, -3) and B(5, 6) in the ratio: **[1]**

a) 2 : 1 b) 2 : 3

c) 3 : 5 d) 1 : 2

13. A well-planned locality has two straight roads perpendicular to each other. There are 5 lanes parallel to Road - I. Each lane has 8 houses as seen in figure. Chaitanya lives in the 6th house of the 5th lane and Hamida lives in the 2nd house of the 2nd lane. What will be the shortest distance between their houses? **[1]**



a) 12 units b) 5 units

c) 6 units d) 10 units

14. The abscissa of any point on the y-axis is **[1]**

a) 0 b) 1

c) y d) -1

15. The coordinates of the mid-point of the line segment joining the points (x_1, y_1) and (x_2, y_2) is given by **[1]**

a) $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ b) $\left(\frac{x_1-x_2}{2}, \frac{y_1-y_2}{2}\right)$

c) $\left(\frac{x_1-y_1}{2}, \frac{x_2-y_2}{2}\right)$ d) $\left(\frac{x_1+y_1}{2}, \frac{x_2+y_2}{2}\right)$

16. The ordinate of the point on the y-axis, which is equidistant from (-4, 1) and (2, 3) is: **[1]**

a) 1 b) 2

c) -1 d) -2

17. The distance between the points (a, a) and $(-\sqrt{3}a, \sqrt{3}a)$ is **[1]**

a) $2\sqrt{2}$ units b) $3\sqrt{2}a$ units

c) 2 units d) $2a\sqrt{2}$ units

18. Which point on x-axis is equidistant from the points A(7, 6) and B(-3, 4)? **[1]**

a) (-4, 0)

b) (0, 4)

c) (0, 3)

d) (3, 0)

19. The distance between the points (0, 5) and (–5, 0) is **[1]**

a) $5\sqrt{2}$

b) 10

c) 5

d) $2\sqrt{5}$

20. A line intersects the y-axis and x-axis at the points P and Q, respectively. If (2, –5) is the mid-point of PQ, then the coordinates of P and Q are, respectively **[1]**

a) (0, – 5) and (2, 0)

b) (0, 4) and (– 10, 0)

c) (0, 10) and (– 4, 0)

d) (0, – 10) and (4, 0)

21. **Assertion (A):** Point (0, 3) has image (0, –3). **[1]**

Reason (R): Image of (0, k) is (0, –k) only.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

22. **Assertion (A):** The point (0, 4) lies on y-axis. **[1]**

Reason (R): The x coordinate on the point on y-axis is zero.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

23. **Assertion (A):** Distance between (5, 12) and origin is 13 units. **[1]**

Reason (R): D = $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

24. **Assertion (A):** The point which divides the line joining the points A(1, 2) and B(-1, 1) internally in the ratio 1: 2 is $\left(\frac{-1}{3}, \frac{5}{3}\right)$ **[1]**

Reason (R): The coordinates of the point P(x, y) which divides the line segment joining the points A(x_1, y_1) and B(x_2, y_2) in the ratio $m_1 : m_2$ is $\left(\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

25. **Assertion (A):** Line segment joining (1, 1) and (5, 5) meet x-axis at (3, 0). **[1]**

Reason (R): Using section formulas x = $\frac{mx_2+nx_1}{m+n}$, $\frac{my_2+ny_1}{m+n}$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

26. **Assertion (A):** Image of point (–5, 0) is (5, 0). **[1]**

Reason (R): Image of point (a, 0) is (–a, 0).

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

27. **Assertion (A):** If A(2a, 4a) and B(2a, 6a) are two vertices of an equilateral triangle ABC then the vertex C is given by (2a + $a\sqrt{3}$, 5a). **[1]**

Reason (R): In an equilateral triangle, all the coordinates of three vertices can be rational.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

28. **Assertion (A):** The value of y is 6, for which the distance between the points P(2, -3) and Q(10, y) is 10. **[1]**

Reason (R): Distance between two given points A(x_1, y_1) and B(x_2, y_2) is given 6

AB = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

29. **Assertion (A):** Distance between (3, 7) and its image under x-axis is 6 units. **[1]**

Reason (R): Coordinates of centroid = $\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

30. **Assertion (A):** Distance of (–4, 3) from x-axis is 5 units. **[1]**

Reason (R): Distance of point (a, b) from x-axis is |b| (mod b) units.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

31. If a point A (0, 2) is equidistant from the points B(3, p) and C(p, 5), then find the value of p. **[2]**

32. Find the distance between the points: A(9, 3) and B(15, 11). **[2]**

33. Find the distance of A(5, -12) points from the origin. **[2]**

34. If the mid-point of the line segment joining A($\frac{x}{2}$, $\frac{y+1}{2}$) and B(x + 1, y - 3) is C(5, -2), find y. **[2]**

35. If the mid-point of the line joining (3, 4) and (k, 7) is (x, y) and 2x + 2y + 1 = 0 find the value of k. **[2]**

36. In what ratio does the point C ($\frac{3}{5}, \frac{11}{5}$) divide the line segment joining the points A (3, 5) and B (-3, -2)? **[2]**

37. Find the point on x-axis which is equidistant from the points (–2, 5) and (2, – 3). **[2]**

38. Find the ratio in which the point P(x, 2) divides the join of A(12, 5) and B(4, -3). **[2]**

39. Find the coordinates of the points of trisection of the line segment joining the points A(5, -3) and B(-4, 3). **[2]**

40. P(-2, 5) and Q(3, 2) are two points. Find the coordinates of the point R on line segment PQ such that PR = 2QR. **[2]**

41. Find the coordinates of the point where the diagonals of the parallelogram formed by joining the points (-2, -1), **[2]**

(1, 0), (4, 3) and (1, 2) meet.

42. 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. **[2]**

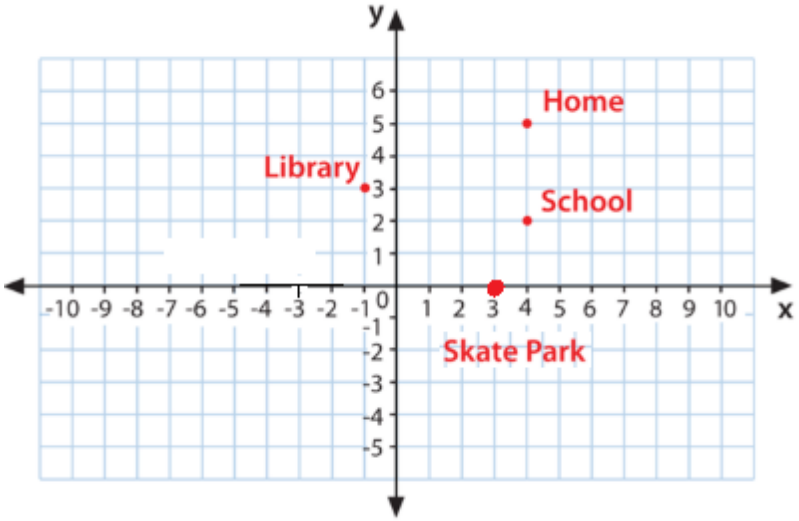
43. The coordinates of A and B are (1, 2) and (2, 3). Find the coordinates of R so that $\frac{AR}{RB} = \frac{4}{3}$. **[2]**

44. Find the co-ordinates of the points of trisection of the line-segment joining the points (5, 3) and (4, 5). **[2]**

45. Let A(4, 2), B (6, 5) and C(1, 4) be the vertices of triangle ABC. Find the coordinates of the point P on AD such that AP : PD = 2:1. **[2]**

Section C

46. Two brothers Ramesh and Pulkit were at home and have to reach School. Ramesh went to Library first to return a book and then reaches School directly whereas Pulkit went to Skate Park first to meet his friend and then reaches School directly. **[3]**



i. How far is School from their Home?

ii. What is the extra distance travelled by Ramesh in reaching his School?

iii. What is the extra distance travelled by Pulkit in reaching his School? (All distances are measured in metres as straight lines)

47. The points (3, -4) and (-6, 2) are the extremities of a diagonal of a parallelogram. If the third vertex is (-1, -3). Find the coordinates of the fourth vertex. **[3]**

48. Find the values of x for which the distance between the point P (2, -3) and Q (x, 5) is 10. **[3]**

49. Find the centre of the circle passing through (5, - 8), (2, - 9) and (2, 1). **[3]**

50. Find the value of p for which the points (-1, 3), (2, p) and (5, -1) are collinear. **[3]**

51. If the point P (2, 2) is equidistant from the points A (-2, k) and B (-2k, -3), find k. Also, find the length of AP. **[3]**

52. Find the ratio in which the point $P\left(\frac{3}{4}, \frac{5}{12}\right)$ divides the line segment joining the point $A\left(\frac{1}{2}, \frac{3}{2}\right)$ and B(2, -5). **[3]**

53. Prove analytically that the line segment joining the middle points of two sides of a triangle is equal to half of the third side. **[3]**

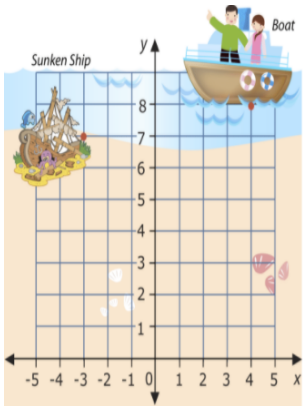
54. Show that the points A (1, 7), B (4, 2), C (-1, -1) and D (-4, 4) are the vertices of a square. **[3]**

55. The three vertices of a parallelogram ABCD taken in order are A (-1, 0), B(3, 1) and C(2, 2). Find the height of a parallelogram with AD as its base. **[3]**

Section D

56. **Read the following text carefully and answer the questions that follow:** **[4]**

Mary and John are very excited because they are going to go on a dive to see a sunken ship. The dive is quite shallow which is unusual because most sunken ship dives are found at depths that are too deep for two junior divers. However, this one is at 40 feet, so the two divers can go to see it.



They have the following map to chart their course. John wants to figure out exactly how far the boat will be from the sunken ship. Use the information in this lesson to help John figure out the following.

i. What are the coordinates of the boat and the sunken ship respectively? (1)

ii. How much distance will Mary and John swim through the water from the boat to the sunken ship? (1)

iii. If each square represents 160 cubic feet of water, how many cubic feet of water will Mary and John swim through from the boat to the sunken ship? (2)

OR

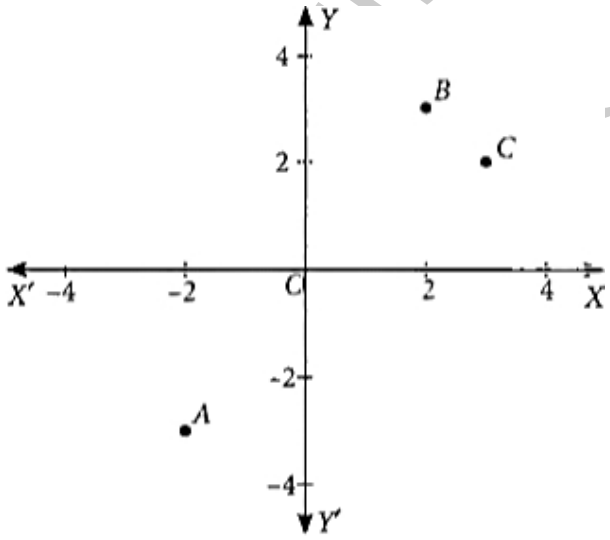
If the distance between the points (x, -1) and (3, 2) is 5, then what is the value of x? (2)

57. **Read the following text carefully and answer the questions that follow:** **[4]**

There are two routes to travel from source A to destination B by bus. First bus reaches at B via point C and second bus reaches from A to B directly. The position of A, B and C are represented in the following graph: Based on the above information, answer the following questions.

Scale: x-axis : 1 unit = 1 km

y-axis: 1 unit = 1 km



i. If the fare for the second bus is ₹15/km, then what will be the fare to reach to the destination by this bus? (1)

ii. What is the distance between A and B? (1)

iii. What is the distance between A and C? (2)

OR

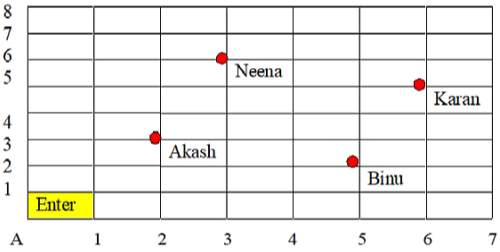
If it is assumed that both buses have same speed, then by which bus do you want to travel from A to B? (2)

58. **Read the following text carefully and answer the questions that follow:** **[4]**

Karan went to the Lab near to his home for COVID 19 test along with his family members.

The seats in the waiting area were as per the norms of distancing during this pandemic (as shown in the figure).

His family member took their seats surrounded by red circular area.



i. What is the distance between Neena and Karan? (1)

ii. What are the coordinates of seat of Akash? (1)

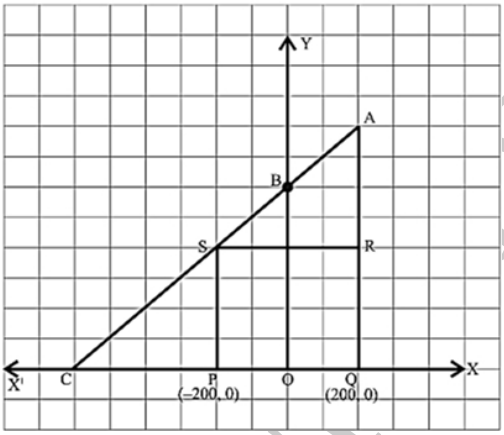
iii. What will be the coordinates of a point exactly between Akash and Binu where a person can be? (2)

OR

Find distance between Binu and Karan. (2)

59. **Read the following text carefully and answer the questions that follow:** **[4]**

Jagdish has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O.



i. Taking O as origin, coordinates of P are (-200, 0) and of Q are (200, 0). PQRS being a square, what are the coordinates of R and S? (1)

ii. What is the area of square PQRS? (1)

iii. What is the length of diagonal PR in square PQRS? (2)

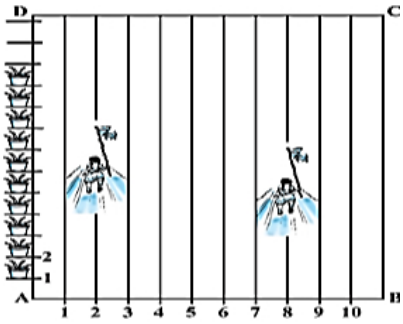
OR

If S divides CA in the ratio K : 1, what is the value of K, where point A is (200, 800)? (2)

60. **Read the following text carefully and answer the questions that follow:** **[4]**

To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown in Fig. Sarika runs the distance AD on the 2nd line and posts a green flag. Priya runs the

distance AD on the eighth line and posts a red flag. (take the position of feet for calculation)



i. What co-ordinates you will use for Green Flag? (1)

ii. What is the distance between the green flag and the red flag? (1)

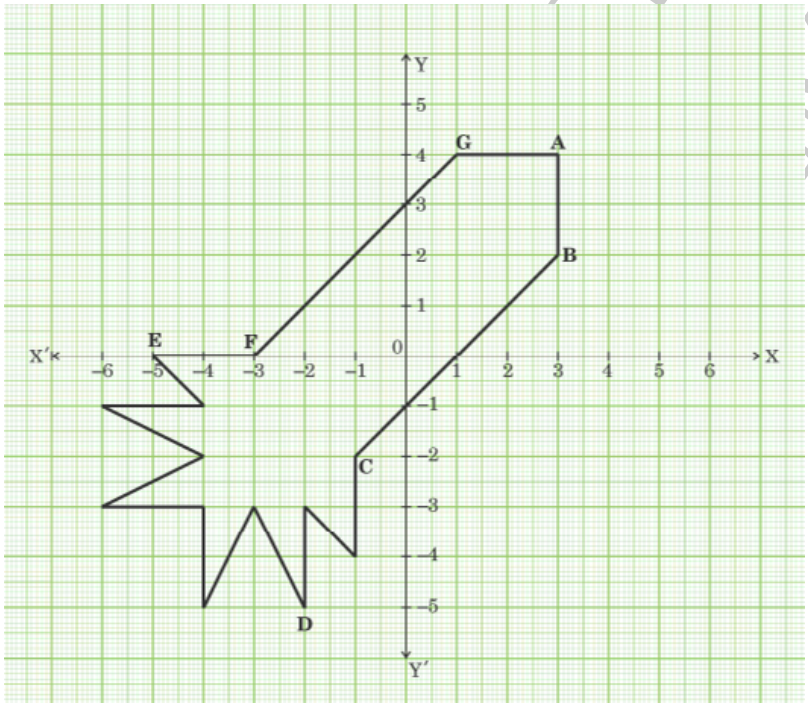
iii. If Monika wants to post a blue flag adjacently in between these two flags. Where she will post a blue flag? (2)

OR

What is the distance between green and blue flag? (2)

61. **Read the following text carefully and answer the questions that follow:** **[4]**

Ryan, from a very young age, was fascinated by the twinkling of stars and the vastness of space. He always dreamt of becoming an astronaut one day. So he started to sketch his own rocket designs on the graph sheet. One such design is given below:



Based on the above, answer the following questions:

i. Find the mid-point of the segment joining F and G. **(1)**

ii. a. What is the distance between the points A and C? **(2)**

OR

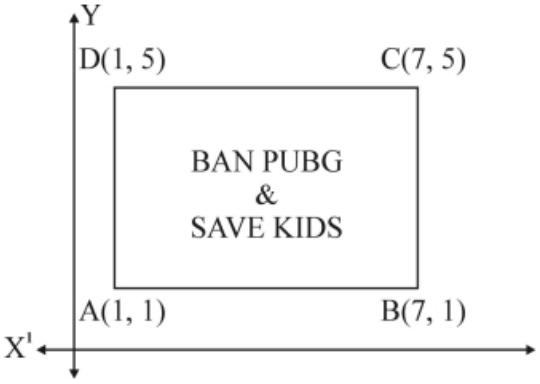
b. Find the coordinates of the point which divides the line segment joining the points A and B in the ratio 1 : 3 internally. **(2)**

iii. What are the coordinates of the point D? **(1)**

62. **Read the following text carefully and answer the questions that follow:** **[4]**

Use of mobile screen for long hours makes your eye sight weak and give you headaches. Children who are

addicted to play "PUBG'' can get easily stressed out. To raise social awareness about ill effects of playing PUBG, a school decided to start 'BAN PUBG' campaign, in which students are asked to prepare campaign board in the shape of a rectangle. One such campaign board made by class X student of the school is shown in the figure.



i. Find the coordinates of the point of intersection of diagonals AC and BD. (1)

ii. Find the length of the diagonal AC. (1)

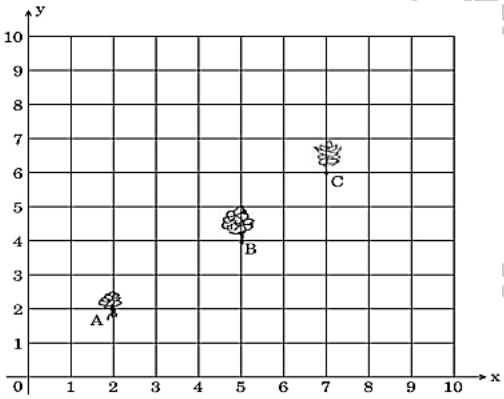
iii. Find the area of the campaign Board ABCD. (2)

OR

Find the ratio of the length of side AB to the length of the diagonal AC. (2)

63. **Read the following text carefully and answer the questions that follow:** **[4]**

Reena has a 10 m $\times$ 10 m kitchen garden attached to her kitchen. She divides it into a 10 $\times$ 10 grid and wants to grow some vegetables and herbs used in the kitchen. She puts some soil and manure in that and sow a green chilly plant at A, a coriander plant at B and a tomato plant at C. Her friend Kavita visited the garden and praised the plants grown there. She pointed out that they seem to be in a straight line. See the below diagram carefully:



i. Find the distance between A and B? (1)

ii. Find the mid-point of the distance AB? (1)

iii. Find the distance between B and C? (2)

OR

Find the mid point of BC. (2)

64. **Read the following text carefully and answer the questions that follow:** **[4]**

To raise social awareness about the hazards of smoking, a school decided to start a 'No smoking' campaign. 10 students are asked to prepare campaign banners in the shape of a triangle. The vertices of one of the triangles are

P(-3, 4), Q(3, 4) and R(-2, -1).

i. What are the coordinates of the centroid of △PQR? (1)

ii. If T be the mid-point of the line joining R and Q, then what are the coordinates of T? (1)

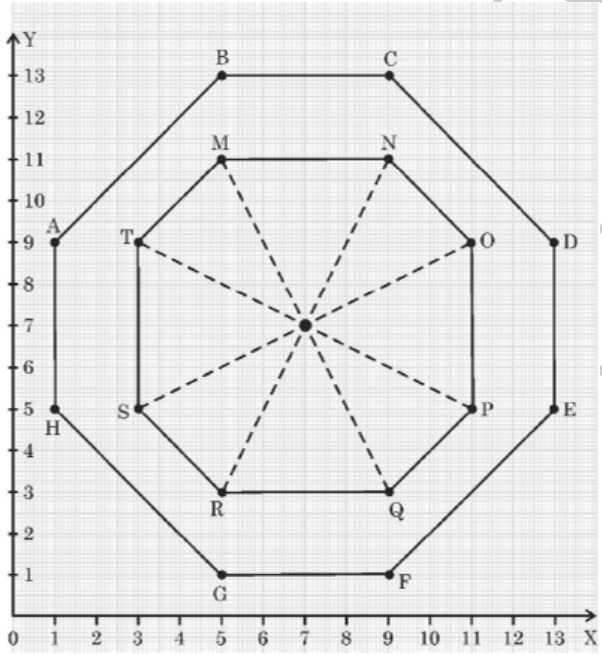
iii. If U be the mid-point of line joining R and P, then what are the coordinates of U? (2)

OR

What are the coordinates of centroid of △STU? (2)

65. **Read the following text carefully and answer the questions that follow:** **[4]**

The top of a table is hexagonal in shape.



On the basis of the information given above, answer the following questions:

i. Write the coordinates of A and B.

ii. Write the coordinates of the mid-point of line segment joining C and D.

iii. a. Find the distance between M and Q.

OR

b. Find the coordinates of the point which divides the line segment joining M and N in the ratio 1:3 internally.

Section E

66. Show that the points A(2,1), B(5, 2), C(6,4) and D(3, 3) are the angular points of a parallelogram. Is this figure a **[5]**

rectangle?

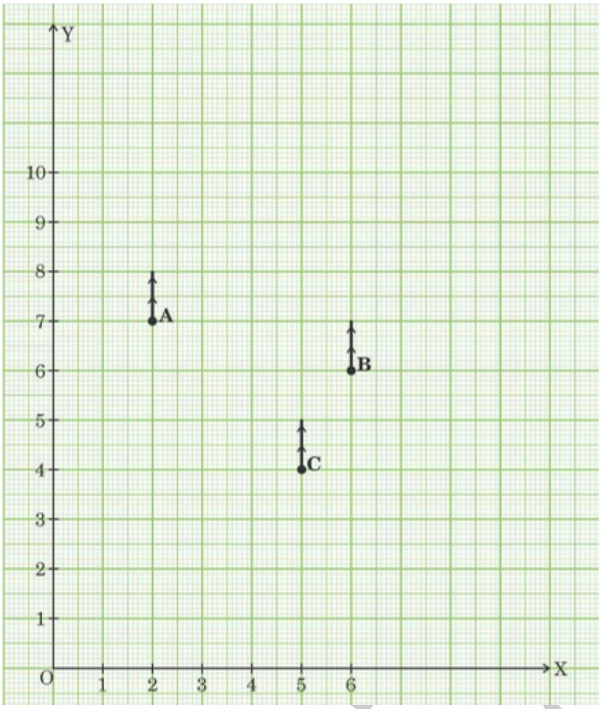
67. A(0, 3), B (-1, -2) and C(4, 2) are vertices of a △ABC. D is a point on the side BC such that $\frac{BD}{DC} = \frac{1}{2}$. P is a point on AD such that AP $= \frac{2\sqrt{5}}{3}$ **[5]**

68. If the coordinates of the mid-points of the sides of a triangle are (3, 4), (4, 6) and (5,7), find its vertices. **[5]**

69. Find the area of the triangle formed by joining the midpoints of the sides of the triangle whose vertices are A(2, 2), B(4, 4) and C(2, 6). **[5]**

70. In what ratio is the line segment joining A(2, -3) and B(5, 6) divided by the x-axis? Also, find the coordinates of the point of division. **[5]**

71. Resident Welfare Association (RWA) of Gulmohar Society in Delhi, have installed three electric poles A, B and C in the society's common park. Despite these three poles, some parts of the park are still in the dark. So, RWA decides to have one more electric pole D in the park. The park can be modelled as a coordinate system given below. **[5]**



On the basis of the above information, answer the following questions:

i. What is the position of the pole C?

ii. What is the distance of the pole B from the corner O of the park?

iii. a. Find the position of the fourth pole D so that the four points A, B, C and D form a parallelogram ABCD.

OR

b. Find the distance between poles A and C.

72. The base BC of an equilateral triangle ABC lies on y-axis. The co-ordinates of point C are (0, - 3). The origin is the mid-point of the base. Find the co-ordinates of the point A and B. Also find the co-ordinates of another point D such that BACD is a rhombus. **[5]**

73. i. Derive section formula. **[5]**

ii. In what ratio does the point (-4, 6) divide the line segment joining the points A(-6, 10) and B(3, -8).

74. Name the type of quadrilateral formed, if any, by the points (-1, -2), (1, 0), (-1, 2), (-3, 0), and give a reason for your answer. **[5]**

75. If the centre of circle is (2a, a – 7) then find the values of a if the circle passes through the point (11, –9) and has diameter $10\sqrt{2}$ units. **[5]**