PRACTICE PAPER 02 (2026-27)
CHAPTER 01
Orienting Yourself: The Use of Coordinates

SUBJECT: MATHEMATICS **MAX. MARKS : 40**
CLASS : IX **DURATION : 1½ hrs**

General Instructions:
(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. A point lies 4 units to the right of origin and 3 units below x-axis. Its coordinates are:
(a) (4,3) (b) (4,-3) (c) (-4,3) (d) (-4,-3)

2. Which point lies in third quadrant and equidistant from both axes?
(a) (-5,-5) (b) (-5,5) (c) (5,-5) (d) (5,5)

3. Distance between $(3, 4)$ and origin is:
(a) 7 (b) 5 (c) 25 (d) 1

4. Midpoint of $(2, -6)$ and $(8, 4)$ is:
(a) (5,-1) (b) (6,-1) (c) (5,1) (d) (4,-2)

5. Distance between $(1, 2)$ and $(1, 10)$ is:
(a) 10 (b) 9 (c) 8 (d) 7

6. If midpoint is $(3, 4)$ and one endpoint is $(5, 6)$, the other endpoint is:
(a) (1,2) (b) (2,3) (c) (4,5) (d) (6,8)

7. Which points are collinear?
(a) (2,3),(4,7),(6,11) (b) (1,1),(2,3),(3,5) (c) (2,2),(3,3),(5,6) (d) (0,1),(1,3),(2,6)

8. Number of points on y-axis equidistant from (3, 2) and $(3, -2)$:
(a) 1 (b) 2 (c) Infinite (d) 0

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(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.

9. **Assertion (A):** The distance between the origin $O(0,0)$ and the point $P(a, b)$ is $OP = \sqrt{a^2 + b^2}$.
Reason (R): The distance between two points (x_1, y_1) and (x_2, y_2) is given by
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

10. Assertion (A): If the midpoint of line segment $AB$is the same as the midpoint of line segment BC, then the points A, B, and $C$are collinear.
Reason (R): The midpoint of a line segment always lies on the line joining the two endpoints of the segment.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find the midpoint of the points $(a, b)$and $(-a, b)$. State its position.

12. Find the value of k if the distance between $(k, 5)$ and $(5, k)$is zero.

13. Find all points on the y-axis which are equidistant from the points $(4, 2)$and $(-4,2)$.

14. Find the coordinates of points whose distances from x-axis and y-axis are 7 and 9 respectively.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Check whether the points $(2,1)$, $(4,5)$, $(6,9)$are collinear.

16. Show that the triangle with vertices $(0,0)$, $(9,0)$, $(0,12)$is right-angled.

17. Find a point on the x-axis equidistant from the points $A(2,6)$and $B(6,6)$.

SECTION – D

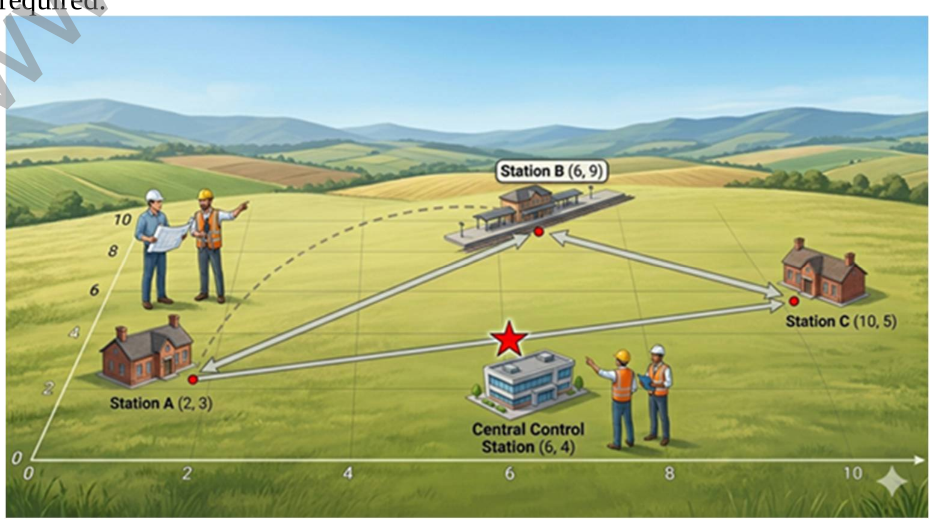
Questions 18 carry 5 marks each.

18. Prove that the points $(2,1)$, $(6,1)$, $(7,4)$, $(3,4)$ form a parallelogram using both Distance formula and midpoint formula.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study 1 - Railway Track Design
Three railway stations are located at $A(1,2)$, $B(4,6)$, and $C(7,10)$. Engineers want to construct a straight railway line connecting all stations if they lie on the same straight path. If not, they plan to build a central control station at the midpoint of the longest route between any two stations. They also need to calculate the maximum distance between stations for estimating cost and materials required.



Using coordinate geometry concepts, answer the following questions.

(a) Using the distance formula, verify whether points A, B, C are collinear. (2)

(b) Identify the pair of stations farthest apart. (1)

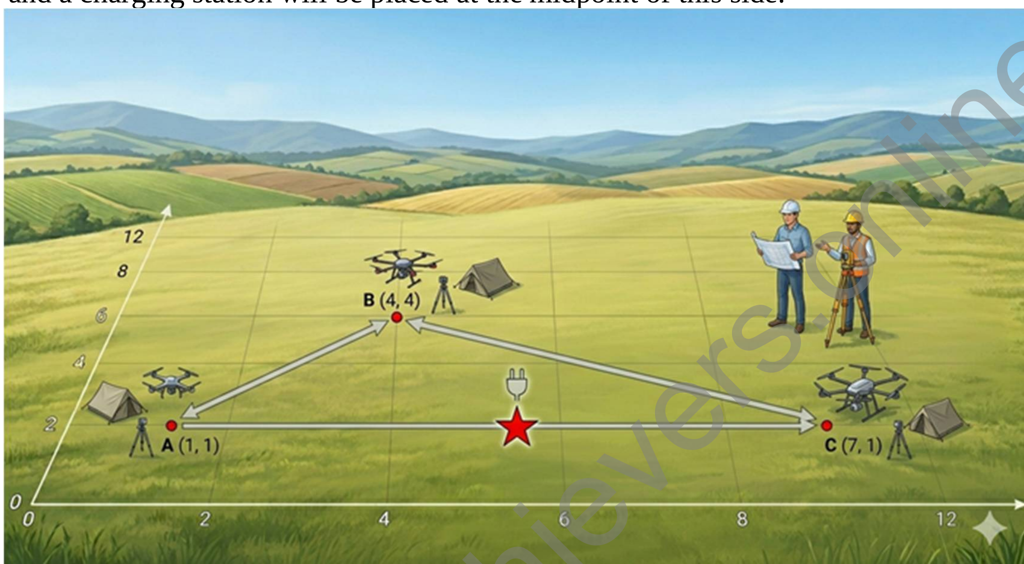
(c) Find midpoint of longest route. (1)

OR

(c) Find distance between farthest stations. (1)

20. Case Study 2 - Drone Navigation Field

A drone is tested at three points $P(2,3)$, $Q(8,3)$, and $R(2,9)$. Engineers want to verify if the path forms a right-angled triangle for optimal navigation. The longest side will act as the drone's main route, and a charging station will be placed at the midpoint of this side.



Using coordinate geometry concepts, answer the following questions.

(a) Verify whether triangle is right-angled. (2)

(b) Determine which side is the hypotenuse. (1)

(c) Find the midpoint of the hypotenuse. (1)

OR

(c) Find coordinates of charging station. (1)

PRACTICE PAPER 02 (2026-27)
CHAPTER 01
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(ANSWERS)

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SECTION – A

Questions 1 to 10 carry 1 mark each.

1. A point lies 4 units to the right of origin and 3 units below x-axis. Its coordinates are:
(a) (4,3) (b) (4,-3) (c) (-4,3) (d) (-4,-3)
Ans: (b) (4,-3)
$x = 4, y = -3$

2. Which point lies in third quadrant and equidistant from both axes?
(a) (-5,-5) (b) (-5,5) (c) (5,-5) (d) (5,5)
Ans: (a) (-5,-5)
$x < 0, y < 0, |x| = |y|$

3. Distance between $(3,4)$ and origin is:
(a) 7 (b) 5 (c) 25 (d) 1
Ans: (b) 5
$\sqrt{3^2 + 4^2} = 5$

4. Midpoint of $(2, -6)$ and $(8,4)$ is:
(a) (5,-1) (b) (6,-1) (c) (5,1) (d) (4,-2)
Ans: (a) (5,-1)
$M = \left(\frac{2+8}{2}, \frac{-6+4}{2}\right) = (5, -1)$

5. Distance between $(1, 2)$ and $(1,10)$s:
(a) 10 (b) 9 (c) 8 (d) 7
Ans: (c) 8
$|10 - 2| = 8$

6. If midpoint is $(3,4)$ and one endpoint is $(5,6)$, the other endpoint is:
(a) (1,2) (b) (2,3) (c) (4,5) (d) (6,8)
Ans: (a) (1,2)
$\frac{5+x}{2} = 3 \Rightarrow x = 1$
$\frac{6+y}{2} = 4 \Rightarrow y = 2$

7. Which points are collinear?
(a) (2,3),(4,7),(6,11) (b) (1,1),(2,3),(3,5) (c) (2,2),(3,3),(5,6) (d) (0,1),(1,3),(2,6)

Ans: (a) (2,3),(4,7),(6,11)
Check (a):
$AB = \sqrt{4 + 16} = \sqrt{20}$, $BC = \sqrt{4 + 16} = \sqrt{20}$
$AC = \sqrt{16 + 64} = \sqrt{80}$
$AB + BC = AC$

8. Number of points on y-axis equidistant from (3, 2) and $(3, -2)$:
(a) 1 (b) 2 (c) Infinite (d) 0
Ans: (a) 1
Let the point on the y-axis be $(0, y)$.
Distance from $(0, y)$ to $(3, 2)$:
$\sqrt{(0-3)^2 + (y-2)^2} = \sqrt{9 + (y-2)^2}$
Distance from $(0, y)$ to $(3, -2)$: $\sqrt{(0-3)^2 + (y+2)^2} = \sqrt{9 + (y+2)^2}$
For the point to be equidistant: $9 + (y-2)^2 = 9 + (y+2)^2$
$\Rightarrow (y-2)^2 = (y+2)^2$
$\Rightarrow y^2 - 4y + 4 = y^2 + 4y + 4$
$\Rightarrow 8y = 0 \Rightarrow y = 0$
Hence, the **only** point on the y-axis that is equidistant from $(3, 2)$ and $(3, -2)$ is (0, 0).

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(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.
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9. **Assertion (A):** The distance between the origin $O(0,0)$ and the point $P(a, b)$ is $OP = \sqrt{a^2 + b^2}$.
Reason (R): The distance between two points (x_1, y_1) and (x_2, y_2) is given by
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
Ans. (a) Both A and R are true and R is the correct explanation of A.
Using the distance formula: $OP = \sqrt{(a-0)^2 + (b-0)^2}$
$\Rightarrow OP = \sqrt{a^2 + b^2}$
Thus, the Assertion is true.

10. **Assertion (A):** If the midpoint of line segment AB is the same as the midpoint of line segment BC, then the points A, B, and C are collinear.
Reason (R): The midpoint of a line segment always lies on the line joining the two endpoints of the segment.
Ans. (a) Both A and R are true and R is the correct explanation of A.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find the midpoint of the points (a, b) and $(-a, b)$. State its position.
Ans:
$M = \left(\frac{a-a}{2}, \frac{b+b}{2}\right)$
$M = (0, b)$
$\therefore$ Midpoint lies on y-axis

12. Find the value of k if the distance between $(k, 5)$ and $(5, k)$ is zero.

Ans: Distance formula: $\sqrt{(k-5)^2+(5-k)^2}=0$
Squaring both sides we get, $(k-5)^2+(5-k)^2=0$
$\Rightarrow (k-5)^2+(-(k-5))^2=0$
$\Rightarrow 2(k-5)^2=0$
$\Rightarrow (k-5)^2=0 \Rightarrow k=5$

13. Find all points on the y-axis which are equidistant from the points $(4,2)$ and $(-4,2)$.
Ans: Let the point be $P(0,y)$.
Distance from $(4,2)$: $PA=\sqrt{(0-4)^2+(y-2)^2}$
Distance from $(-4,2)$: $PB=\sqrt{(0+4)^2+(y-2)^2}$
$\Rightarrow PA^2=16+(y-2)^2$
$\Rightarrow PB^2=16+(y-2)^2$
$\Rightarrow PA=PB$ for all values of y
$\therefore$ All points $(0,y)$ satisfy the condition

14. Find the coordinates of points whose distances from x-axis and y-axis are 7 and 9 respectively.
Ans: Distance from x-axis = $|y|=7$
Distance from y-axis = $|x|=9$
$x=\pm 9, y=\pm 7$
$\therefore$ Points are $(9,7),(-9,7),(9,-7),(-9,-7)$

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Check whether the points $(2,1),(4,5),(6,9)$ are collinear.
Ans: $AB=\sqrt{(4-2)^2+(5-1)^2}=\sqrt{4+16}=\sqrt{20}$
$BC=\sqrt{(6-4)^2+(9-5)^2}=\sqrt{4+16}=\sqrt{20}$
$AC=\sqrt{(6-2)^2+(9-1)^2}=\sqrt{16+64}=\sqrt{80}$
Now, $AB+BC=\sqrt{20}+\sqrt{20}=2\sqrt{20}$
$AC=\sqrt{80}=2\sqrt{20}$
$\therefore AB+BC=AC$
$\therefore$ Points are collinear

16. Show that the triangle with vertices $(0,0),(9,0),(0,12)$ is right-angled.
Ans: $AB=9, AC=12$
$BC=\sqrt{(9-0)^2+(0-12)^2}=\sqrt{81+144}=\sqrt{225}=15$
Now, $AB^2+AC^2=9^2+12^2=81+144=225$
$BC^2=15^2=225$
$\therefore AB^2+AC^2=BC^2$
$\therefore$ Triangle is right-angled at A

17. Find a point on the x-axis equidistant from the points $A(2,6)$ and $B(6,6)$.
Ans: Let the required point be $P(x,0)$.
Distance from A: $PA=\sqrt{(x-2)^2+(0-6)^2}$
Distance from B: $PB=\sqrt{(x-6)^2+(0-6)^2}$
Since $PA=PB$, therefore $(x-2)^2+36=(x-6)^2+36$
$\Rightarrow (x-2)^2=(x-6)^2$
$\Rightarrow x^2-4x+4=x^2-12x+36$
$\Rightarrow -4x+4=-12x+36$
$\Rightarrow 8x=32 \Rightarrow x=4$
$\therefore$ Required point is $(4,0)$

SECTION – D

Questions 18 carry 5 marks each.

18. Prove that the points $(2,1)$, $(6,1)$, $(7,4)$, $(3,4)$ form a parallelogram using both Distance formula and midpoint formula.

Ans: Let $A(2,1)$, $B(6,1)$, $C(7,4)$, $D(3,4)$

Method-1: Lengths of opposite sides

$AB = \sqrt{(6-2)^2 + (1-1)^2} = 4$

$CD = \sqrt{(3-7)^2 + (4-4)^2} = 4$

$BC = \sqrt{(7-6)^2 + (4-1)^2} = \sqrt{1+9} = \sqrt{10}$

$AD = \sqrt{(3-2)^2 + (4-1)^2} = \sqrt{1+9} = \sqrt{10}$

$\therefore AB = CD, BC = AD$

Since the opposite sides are equal, therefore ABCD is a parallelogram

Method-2: Diagonals bisect each other

Midpoint of AC:

$M_1 = \left(\frac{2+7}{2}, \frac{1+4}{2}\right) = \left(\frac{9}{2}, \frac{5}{2}\right)$

Midpoint of BD:

$= M_2 = \left(\frac{6+3}{2}, \frac{1+4}{2}\right) = \left(\frac{9}{2}, \frac{5}{2}\right)$

$M_1 = M_2$

$\therefore$ Diagonals bisect each other

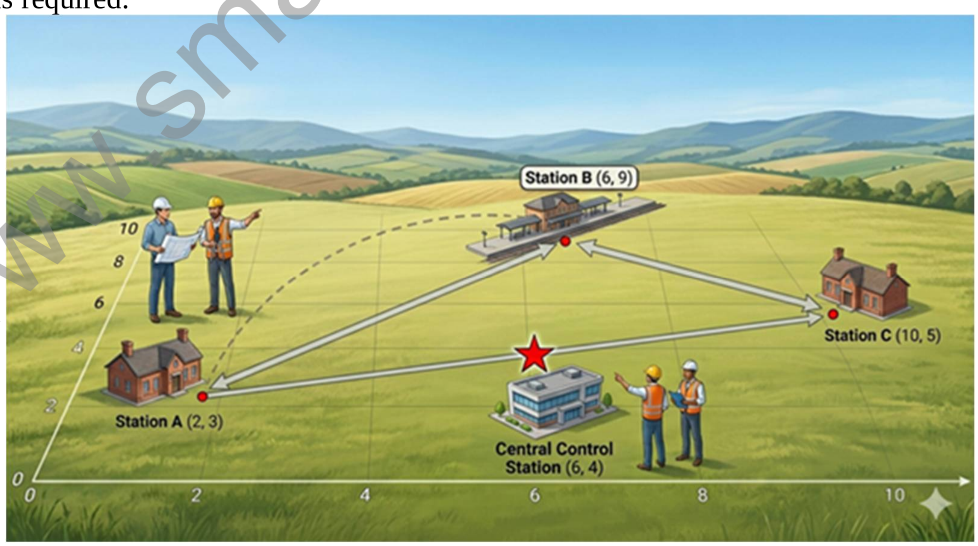
$\therefore ABCD$ is a parallelogram

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study 1 - Railway Track Design

Three railway stations are located at $A(1,2)$, $B(4,6)$, and $C(7,10)$. Engineers want to construct a straight railway line connecting all stations if they lie on the same straight path. If not, they plan to build a central control station at the midpoint of the longest route between any two stations. They also need to calculate the maximum distance between stations for estimating cost and materials required.



Using coordinate geometry concepts, answer the following questions.

(a) Using the distance formula, verify whether points A, B, C are collinear. (2)

(b) Identify the pair of stations farthest apart. (1)

(c) Find midpoint of longest route. (1)

OR

(c) Find distance between farthest stations. (1)

Ans: (a) Verify whether the points are collinear.

$AB = \sqrt{25} = 5, BC = \sqrt{25} = 5, AC = \sqrt{100} = 10$

$AB + BC = AC \Rightarrow$ Collinear

(b) Identify farthest stations.

$AC = 10$ (maximum)

(c) Find midpoint.

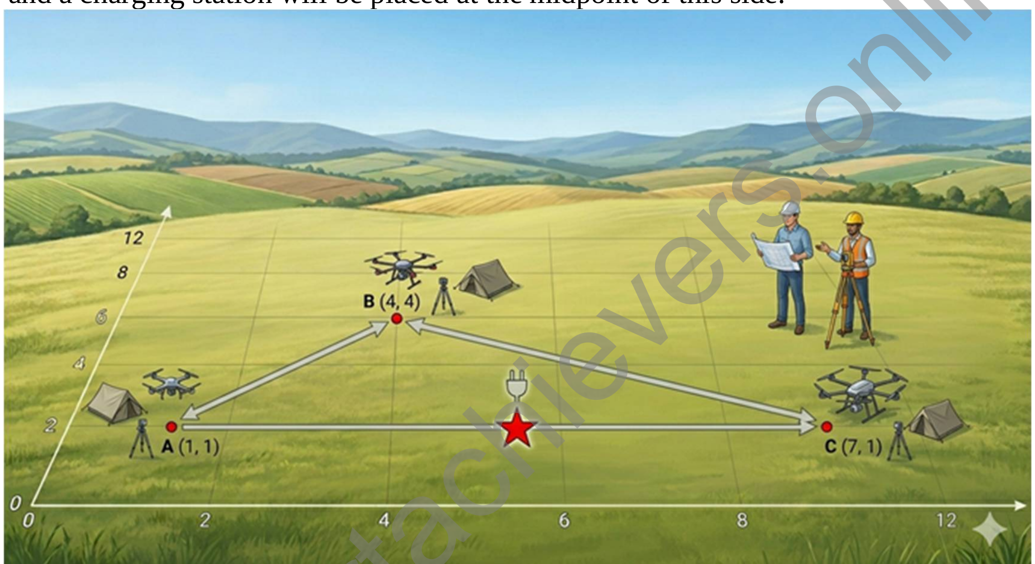
$M = (4,6)$

(d) Find distance.

$AC = 10$

20. Case Study 2 - Drone Navigation Field

A drone is tested at three points $P(2,3)$, $Q(8,3)$, and $R(2,9)$. Engineers want to verify if the path forms a right-angled triangle for optimal navigation. The longest side will act as the drone's main route, and a charging station will be placed at the midpoint of this side.



Using coordinate geometry concepts, answer the following questions.

(a) Verify whether triangle is right-angled. (2)

(b) Determine which side is the hypotenuse. (1)

(c) Find the midpoint of the hypotenuse. (1)

OR

(c) Find coordinates of charging station. (1)

Ans: (a) Verify right angle.

$PQ = 6$, $PR = 6$, $QR = \sqrt{72}$

$PQ^2 + PR^2 = QR^2 \Rightarrow$ Right-angled

(b) Identify hypotenuse.

QR

(c) Find midpoint.

$M = (5,6)$

(d) Coordinates of charging station.

$(5, 6)$