CLASS 10 · MATHEMATICS · CHAPTER 7

Coordinate Geometry - Exercise 7.1

Exercise 7.1 with independently verified solutions.

CHAPTER	RESOURCE	SOURCE
Coordinate Geometry	NCERT Exercises	NCERT Mathematics, Reprint 2026-27

PART 1

Verified NCERT questions and solutions

Verified NCERT questions and solutions

Solutions are checked independently and follow the supplied NCERT chapter edition.

QUESTION

Question 1

distance formula · coordinate pairs

Find the distance between each pair of points:

(i) (2, 3) and (4, 1)

(ii) (-5, 7) and (-1, 3)

(iii) (a, b) and (-a, -b)

Solution

Board-exam working:

Use the distance formula:

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

(i)

$$d = \sqrt{(4 - 2)^2 + (1 - 3)^2}$$

$$d = \sqrt{2^2 + (-2)^2} = \sqrt{8} = 2\sqrt{2}$$

(ii)

$$d = \sqrt{(-1-(-5))^2 + (3-7)^2}$$

$$d = \sqrt{4^2 + (-4)^2} = \sqrt{32} = 4\sqrt{2}$$

(iii)

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

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

$$d = \sqrt{4a^2 + 4b^2} = 2\sqrt{a^2 + b^2}$$

Final answer

(i) 2√2 units; (ii) 4√2 units; (iii) 2√(a² + b²) units.

QUESTION

Question 2

distance formula · towns · application

Find the distance between (0, 0) and (36, 15). Hence find the distance between towns A and B discussed in Section 7.2.

Solution

Board-exam working:

Using the distance formula:

$$AB = \sqrt{(36-0)^2 + (15-0)^2}$$

$$AB = \sqrt{1296 + 225}$$

$$AB = \sqrt{1521} = 39$$

Since one coordinate unit represents 1 km, the distance between the towns is 39 km.

Final answer

The distance is 39 units, so towns A and B are 39 km apart.

QUESTION

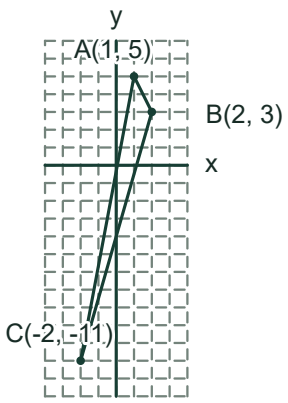
Question 3

distance formula · collinearity

Determine whether A(1, 5), B(2, 3) and C(-2, -11) are collinear.

Solution

Board-exam working:



Checking whether three points are collinear — solution sketch (not to scale).

Calculate the three distances:

$$AB = \sqrt{(2-1)^2 + (3-5)^2} = \sqrt{1+4} = \sqrt{5}$$

$$BC = \sqrt{(-2-2)^2 + (-11-3)^2} = \sqrt{16+196} = 2\sqrt{53}$$

$$AC = \sqrt{(-2-1)^2 + (-11-5)^2} = \sqrt{9+256} = \sqrt{265}$$

For three collinear points, one distance must equal the sum of the other two.

$$\sqrt{5} + 2\sqrt{53} \neq \sqrt{265}$$

No one of the three distances equals the sum of the other two. Therefore, the points are not collinear.

Final answer

The three points are not collinear.

QUESTION

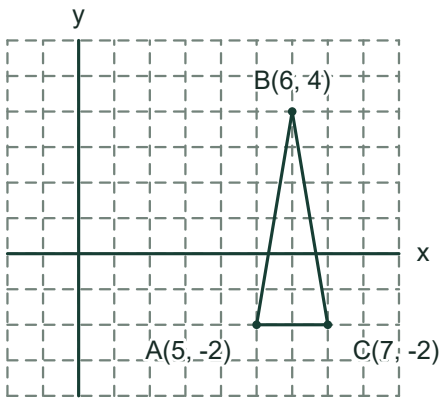
Question 4

distance formula · isosceles triangle

Check whether A(5, -2), B(6, 4) and C(7, -2) are the vertices of an isosceles triangle.

Solution

Board-exam working:



Isosceles triangle on coordinate axes — solution sketch (not to scale).

Using the distance formula:

$$AB = \sqrt{(6-5)^2 + (4-(-2))^2} = \sqrt{1+36} = \sqrt{37}$$

$$BC = \sqrt{(7-6)^2 + (-2-4)^2} = \sqrt{1+36} = \sqrt{37}$$

$$AC = \sqrt{(7-5)^2 + (-2-(-2))^2} = \sqrt{4} = 2$$

$$AB = BC$$

Two sides are equal. Therefore, △ABC is an isosceles triangle with base AC.

Final answer

Yes. The points form an isosceles triangle with AB = BC = $\sqrt{37}$ units.

QUESTION

Question 5

distance formula · square · classroom grid

In Figure 7.8, four friends sit at A(3, 4), B(6, 7), C(9, 4) and D(6, 1). Champa says ABCD is a square, while Chameli disagrees. Use the distance formula to decide who is correct.

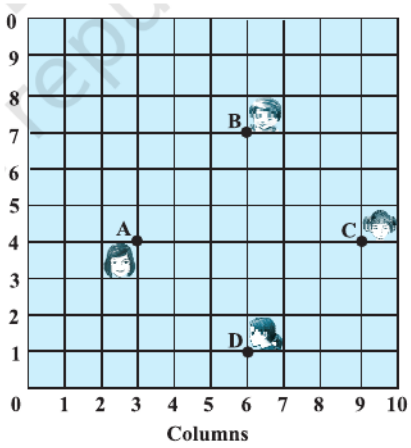


Fig. 7.8

Figure 7-8 from the supplied NCERT chapter.

Solution

Board-exam working:

Calculate the four sides:

$$AB = \sqrt{(6-3)^2 + (7-4)^2} = \sqrt{9+9} = 3\sqrt{2}$$

$$BC = \sqrt{(9-6)^2 + (4-7)^2} = \sqrt{9+9} = 3\sqrt{2}$$

$$CD = \sqrt{(6-9)^2 + (1-4)^2} = \sqrt{9+9} = 3\sqrt{2}$$

$$DA = \sqrt{(3-6)^2 + (4-1)^2} = \sqrt{9+9} = 3\sqrt{2}$$

Now calculate the diagonals:

$$AC = \sqrt{(9-3)^2 + (4-4)^2} = 6$$

$$BD = \sqrt{(6-6)^2 + (1-7)^2} = 6$$

$$AB = BC = CD = DA$$

$$AC = BD$$

All four sides are equal and the diagonals are equal. Therefore, ABCD is a square.

Final answer

Champa is correct: ABCD is a square.

QUESTION

Question 6

distance formula · quadrilateral classification

Name the type of quadrilateral formed, if any, by each ordered set of points. Give reasons:

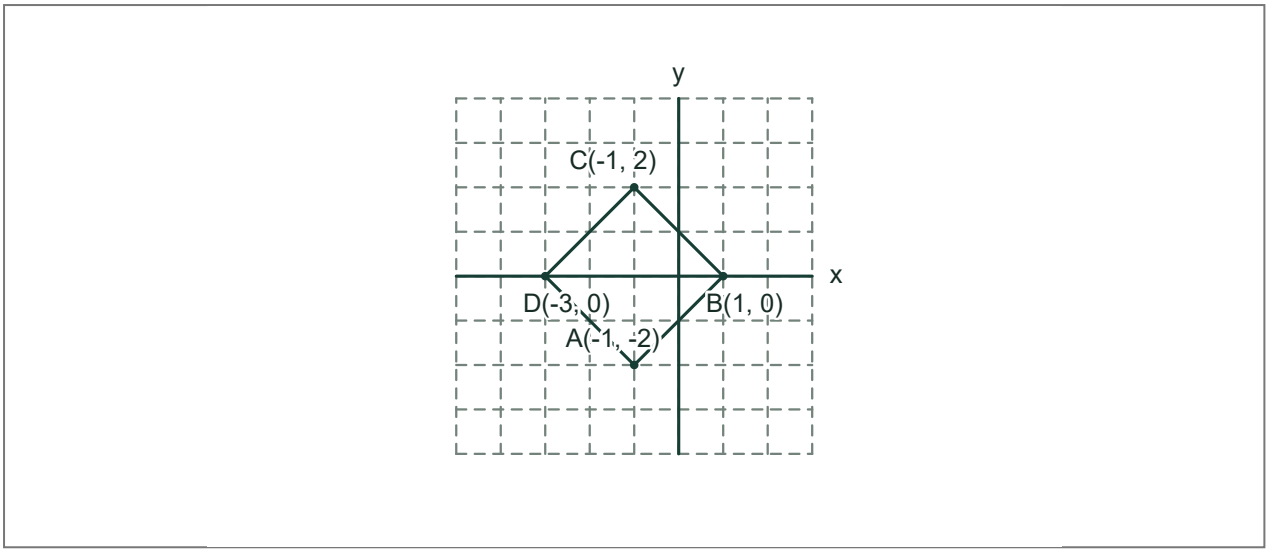
(i) (-1, -2), (1, 0), (-1, 2), (-3, 0)

(ii) (-3, 5), (3, 1), (0, 3), (-1, -4)

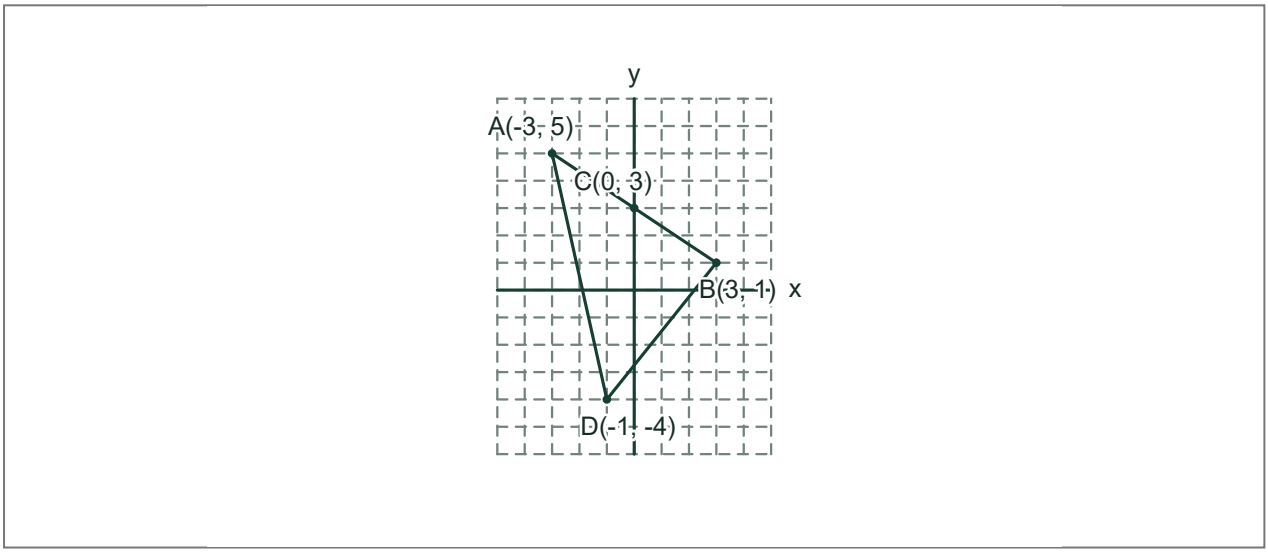
(iii) (4, 5), (7, 6), (4, 3), (1, 2)

Solution

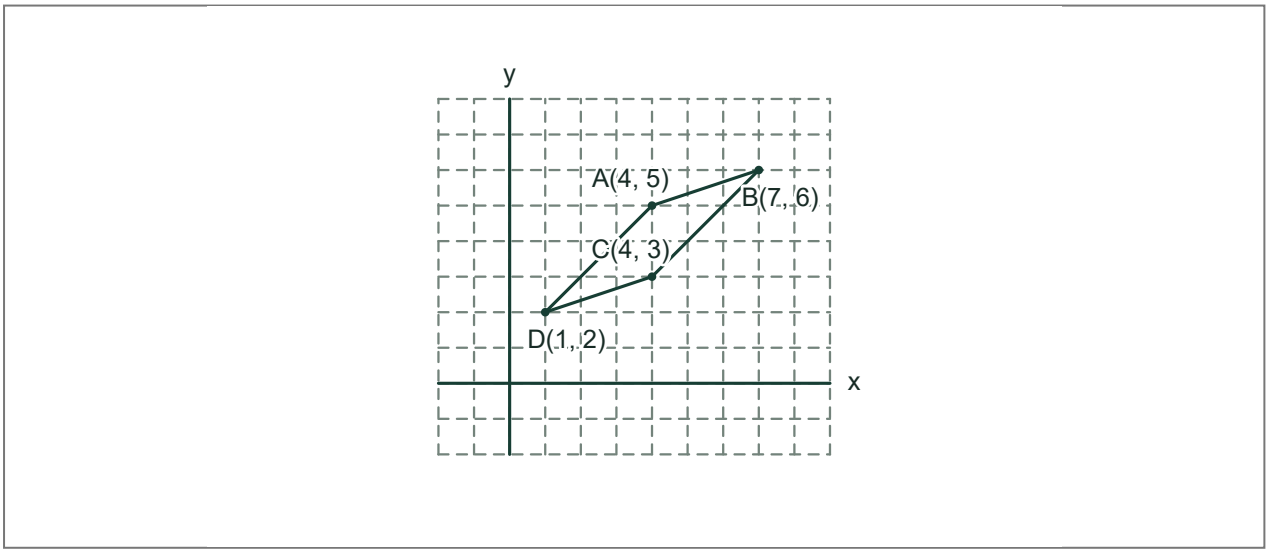
Board-exam working:



Question 6(i): square — solution sketch (not to scale).



Question 6(ii): three collinear vertices — solution sketch (not to scale).



Question 6(iii): parallelogram — solution sketch (not to scale).

Let the four points in each part be A, B, C and D in the given order.

(i) Calculate the sides:

$$AB = BC = CD = DA = \sqrt{(2)^2 + (2)^2} = 2\sqrt{2}$$

Calculate the diagonals:

$$AC = 4, \qquad BD = 4$$

All four sides are equal and both diagonals are equal. Therefore, ABCD is a square.

(ii) Calculate the sides:

$$AB = \sqrt{(3 - (-3))^2 + (1 - 5)^2} = 2\sqrt{13}$$

$$AC = \sqrt{(0 - (-3))^2 + (3 - 5)^2} = \sqrt{13}$$

$$CB = \sqrt{(3 - 0)^2 + (1 - 3)^2} = \sqrt{13}$$

$$AC + CB = \sqrt{13} + \sqrt{13} = 2\sqrt{13} = AB$$

Therefore, A, C and B are collinear. Three of the given points lie on one straight line, so the four points do not form a quadrilateral.

(iii) Calculate the sides:

$$AB = \sqrt{(7 - 4)^2 + (6 - 5)^2} = \sqrt{10}$$

$$BC = \sqrt{(4 - 7)^2 + (3 - 6)^2} = 3\sqrt{2}$$

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

$$DA = \sqrt{(4-1)^2 + (5-2)^2} = 3\sqrt{2}$$

$$AB = CD, \qquad BC = DA$$

Both pairs of opposite sides are equal. Therefore, ABCD is a parallelogram.

Final answer

(i) Square; (ii) no quadrilateral; (iii) parallelogram.

QUESTION

Question 7

x-axis · equidistant point · distance formula

Find the point on the x-axis which is equidistant from A(2, -5) and B(-2, 9).

Solution

Board-exam working:

A point on the x-axis has y-coordinate 0. Let the required point be P(x, 0).

Since P is equidistant from A and B:

$$PA = PB$$

Squaring both sides:

$$(x-2)^2 + (0-(-5))^2 = (x-(-2))^2 + (0-9)^2$$

Expanding:

$$x^2 - 4x + 4 + 25 = x^2 + 4x + 4 + 81$$

$$-4x + 29 = 4x + 85$$

$$-8x = 56$$

$$x = -7$$

Final answer

The required point is (-7, 0).

QUESTION

Question 8

distance formula · quadratic equation · two values

Find the values of y for which the distance between P(2, -3) and Q(10, y) is 10 units.

Solution

Board-exam working:

Using the distance formula:

$$\sqrt{(10-2)^2 + (y-(-3))^2} = 10$$

Squaring both sides:

$$8^2 + (y+3)^2 = 10^2$$

$$64 + (y+3)^2 = 100$$

$$(y+3)^2 = 36$$

$$y + 3 = \pm 6$$

Therefore:

$$y = 3 \quad \text{or} \quad y = -9$$

Final answer

y = 3 or y = -9.

QUESTION

Question 9

equidistant point · distance formula · two values

Q(0, 1) is equidistant from P(5, -3) and R(x, 6). Find x. Also find QR and PR.

Solution

Board-exam working:

First calculate QP²:

$$QP^2 = (5-0)^2 + (-3-1)^2 = 25 + 16 = 41$$

Since Q is equidistant from P and R:

$$QR^2 = QP^2$$

$$(x-0)^2 + (6-1)^2 = 41$$

$$x^2 + 25 = 41$$

$$x^2 = 16$$

$$x = 4 \quad \text{or} \quad x = -4$$

In both cases:

$$QR = \sqrt{41} \text{ units}$$

When x = 4, R = (4, 6):

$$PR = \sqrt{(4-5)^2 + (6-(-3))^2} = \sqrt{1+81} = \sqrt{82}$$

When x = -4, R = (-4, 6):

$$PR = \sqrt{(-4-5)^2 + (6-(-3))^2} = \sqrt{81+81} = 9\sqrt{2}$$

Final answer

x = 4 or -4; QR = √41 units. PR = √82 units when x = 4, and 9√2 units when x = -4.

QUESTION

Question 10

equidistant point · distance formula · locus

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

Solution

Board-exam working:

Since P is equidistant from A and B:

$$PA = PB$$

Squaring both sides:

$$(x-3)^2+(y-6)^2=(x-(-3))^2+(y-4)^2$$

Expanding:

$$x^2-6x+9+y^2-12y+36=x^2+6x+9+y^2-8y+16$$

Cancelling equal terms and simplifying:

$$-6x-12y+45=6x-8y+25$$

$$12x+4y-20=0$$

$$3x+y-5=0$$

Final answer

The required relation is 3x + y - 5 = 0.