Class 10 Mathematics · Chapter 7: Coordinate Geometry

Answer key and marking scheme · 20 marks · about 40 minutes · based on NCERT

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1. While finding the distance between two points, Aarav gets $PQ^2 = 49$. The distance PQ is [1]

(a) ±7 units (b) −7 units

(c) 7 units (d) 49 units

Answer: (c) A distance is never negative, so only the positive square root is taken: PQ = 7 units.

2. The distance of the point P(−6, 4) from the y-axis is [1]

(a) 6 units (b) 4 units

(c) −6 units (d) $2\sqrt{13}$ units

Answer: (a) The distance from the y-axis is the size of the abscissa: |−6| = 6 units. (4 is the distance from the x-axis; a distance is never −6; $2\sqrt{13}$ is OP.)

3. Which of the following points lies on the x-axis? [1]

(a) (0, −3) (b) (−3, 0)

(c) (3, 3) (d) (−3, 3)

Answer: (b) A point on the x-axis has ordinate 0, so it has the form (x, 0): (−3, 0). (0, −3) lies on the y-axis.

4. The distance of the point (−9, 12) from the origin is [1]

(a) 21 units (b) 3 units

(c) 15 units (d) $3\sqrt{7}$ units

Answer: (c) $OP = \sqrt{(x^2 + y^2)} = \sqrt{(81 + 144)} = \sqrt{225} = 15$. (21 and 3 add and subtract 9 and 12; $3\sqrt{7} = \sqrt{63}$ subtracts the squares.)

5. A kite K is flying at the point (5, −8) on a grid whose x-axis runs along a straight canal bank. The distance of K from the x-axis is [1]

(a) 5 units (b) 8 units

(c) −8 units (d) $\sqrt{89}$ units

Answer: (b) The distance from the x-axis is the size of the ordinate: |−8| = 8 units. (5 is the distance from the y-axis; $\sqrt{89}$ is the distance from the origin.)

6. P and Q are the points of trisection of AB, with P nearer to A. If P is (1, −2) and Q is (4, 2), find A and B. [2]

P is the mid-point of AQ, so $A = (2 \times 1 - 4, 2 \times (-2) - 2) = (-2, -6)$. Q is the mid-point of PB, so $B = (2 \times 4 - 1, 2 \times 2 - (-2)) = (7, 6)$.

- A = (−2, −6), using P as the mid-point of AQ (1)
- B = (7, 6), using Q as the mid-point of PB (1)

7. A point P lies in the second quadrant at a distance of 3 units from the x-axis and 4 units from the y-axis. Write the coordinates of P and find its distance from the origin. [2]

In the second quadrant the abscissa is negative and the ordinate positive. Distance from the y-axis is 4, so x = −4; from the x-axis 3, so y = 3. P = (−4, 3) and $OP = \sqrt{(16 + 9)} = 5$.

- P = (−4, 3) (1)
- OP = 5 units (1)

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8. Find the values of y for which the distance between A(−4, y) and B(2, 1) is 10 units. [2]

$36 + (y - 1)^2 = 100$, so $(y - 1)^2 = 64$ and $y - 1 = \pm 8$. Hence $y = 9$ or $y = -7$; both are admissible.

- forms $36 + (y - 1)^2 = 100$ (1)
- $y = 9$ or $y = -7$ (1)

9. Find the points on the x-axis that are at a distance of 5 units from A(4, 3). Show that one of them is the origin. [3]

A point on the x-axis is (x, 0). $(x - 4)^2 + 9 = 25$, so $(x - 4)^2 = 16$ and $x - 4 = \pm 4$, giving $x = 8$ or $x = 0$. The points are (8, 0) and (0, 0), and (0, 0) is the origin. Check: $OA = \sqrt{(16 + 9)} = 5$.

- takes the point as (x, 0) and forms $(x - 4)^2 + 9 = 25$ (1)
- $x - 4 = \pm 4$ (1)
- (8, 0) and (0, 0); the second is the origin (1)

10. Find the points of trisection of the segment joining A(−5, 7) and B(4, −2). Verify, using the mid-point formula, that the point nearer to B is the mid-point of the segment joining the other point of trisection and B. [3]

P divides AB in 1 : 2: $((4 + 2 \times (-5))/3, (-2 + 2 \times 7)/3) = (-2, 4)$. Q divides AB in 2 : 1: $((8 - 5)/3, (-4 + 7)/3) = (1, 1)$. Mid-point of PB = $((-2 + 4)/2, (4 - 2)/2) = (1, 1) = Q$.

- P = (−2, 4) (1)
- Q = (1, 1) (1)
- mid-point of PB is (1, 1) = Q (1)

11. A cable-car line runs straight from station A(12, 5) to station B(4, −3). A stop P on the line is at the point (x, 2). Find the ratio in which P divides AB and the value of x. [3]

Take the ratio k : 1. Using the ordinate, $(-3k + 5)/(k + 1) = 2$, so $-3k + 5 = 2k + 2$ and $k = 3/5$: the ratio is 3 : 5. Then $x = (3 \times 4 + 5 \times 12)/8 = 72/8 = 9$. P = (9, 2).

- sets $(-3k + 5)/(k + 1) = 2$ (1)
- $k = 3/5$, ratio 3 : 5 (1)
- $x = 9$ (1)

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