MATHS BASEMAKER

Class 10 CBSE — Chapter 7: Coordinate Geometry

Chapter Test Paper

Q1. The distance of the point P(-6, 8) from the origin is:

(a) 8 (b) 2√7

(c) 10 (d) 6

Q2. If the distance between the points A(x, 2) and B(3, -6) is 10 units, what are the possible values of x?

(a) 9, -3 (b) -9, 3

(c) 9, 3 (d) -9, -3

Q3. The point on the x-axis which is equidistant from points A(2, -5) and B(-2, 9) is:

(a) (-7, 0) (b) (7, 0)

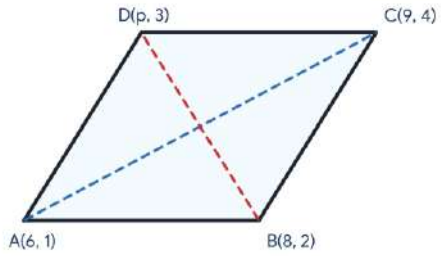
(c) (0, -7) (d) (-6, 0)

Q4. In what ratio does the y-axis divide the line segment joining the points P(-4, 5) and Q(3, -7)?

(a) 3 : 4 (b) 4 : 3

(c) 1 : 2 (d) 2 : 1

Q5. In the given figure, points A(6, 1), B(8, 2), C(9, 4), and D(p, 3) are the vertices of a parallelogram taken in order. Find the value of p.



Video solution link on youtube :

https://youtu.be/nLpdtXgEfkw

Q6. Find the coordinates of the points of trisection of the line segment joining the points A(2, -2) and B(-7, 4).

Q7. Find the coordinates of point P which divides the line segment joining A(-2, 2) and B(2, -4) such that AP/AB = 3/7, where P lies on the segment AB.

Q8. Find the ratio in which the line 2x + y - 4 = 0 divides the line segment joining the points A(2, -2) and B(3, 7).

Q9. [HOTS] If the mid-points of the sides of triangle ABC are D(1, 2), E(0, -1), and F(2, -1), find the coordinates of the vertices A, B, and C of the triangle.

Q10. [HOTS] If the point P(x, y) is equidistant from the points A(a + b, b - a) and B(a - b, a + b), prove that bx = ay.

Video solution link on youtube :

https://youtu.be/nLpdtXgEfkw

HINTS & STEPS

Q1. Solution & Steps

Hint: Distance of point (x, y) from origin (0, 0) is $\sqrt{(x^2 + y^2)}$.

Distance = $\sqrt{[(-6)^2 + 8^2]}$

= $\sqrt{[36 + 64]}$

= $\sqrt{100}$ = 10 units.

Answer: (c) 10

Q2. Solution & Steps

Hint: Use distance formula: $AB^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$, where AB = 10.

$AB^2 = 10^2 = 100$

$(3 - x)^2 + (-6 - 2)^2 = 100$

$(3 - x)^2 + (-8)^2 = 100$

$(3 - x)^2 + 64 = 100$

$(3 - x)^2 = 100 - 64 = 36$

Taking square root on both sides:

$3 - x = 6$ or $3 - x = -6$

$-x = 6 - 3 = 3 \Rightarrow x = -3$

$-x = -6 - 3 = -9 \Rightarrow x = 9$

Therefore, x = 9, -3.

Answer: (a) 9, -3

Q3. Solution & Steps

Hint: Any point on x-axis is P(x, 0). Equate $PA^2 = PB^2$.

Let point be P(x, 0).

$PA^2 = PB^2$

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

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

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

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

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

$-8x = 56 \Rightarrow x = -7$.

Required point is (-7, 0).

Answer: (a) (-7, 0)

Q4. Solution & Steps

Hint: Any point on y-axis has x = 0. Use section formula for x-coordinate.

Let y-axis divide segment joining P(-4, 5) and Q(3, -7) in ratio k : 1.

Coordinates of intersection point on y-axis are (0, y).

x = [k(3) + 1(-4)] / (k + 1) = 0

3k - 4 = 0

3k = 4 => k = 4/3.

Therefore, ratio is 4 : 3 internally.

Answer: (b) 4 : 3

Q5. Solution & Steps

Hint: Diagonals of parallelogram bisect each other, so mid-point of AC = mid-point of BD.

Mid-point of AC = ((6 + 9)/2, (1 + 4)/2) = (15/2, 5/2)

Mid-point of BD = ((8 + p)/2, (2 + 3)/2) = ((8 + p)/2, 5/2)

Equating x-coordinates:

(8 + p)/2 = 15/2

8 + p = 15 => p = 15 - 8 = 7.

Answer: p = 7

Q6. Solution & Steps

Hint: Points of trisection divide segment into three equal parts (ratios 1 : 2 and 2 : 1).

Let P and Q be points of trisection of line segment joining A(2, -2) and B(-7, 4).

Point P divides AB in ratio 1 : 2:

x = [1(-7) + 2(2)] / (1 + 2) = (-7 + 4) / 3 = -3/3 = -1

y = [1(4) + 2(-2)] / (1 + 2) = (4 - 4) / 3 = 0/3 = 0

Coordinates of P = (-1, 0).

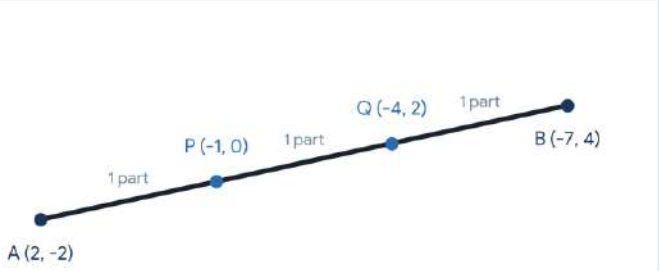
Point Q divides AB in ratio 2 : 1 (or is mid-point of PB):

x = [2(-7) + 1(2)] / (2 + 1) = (-14 + 2) / 3 = -12/3 = -4

y = [2(4) + 1(-2)] / (2 + 1) = (8 - 2) / 3 = 6/3 = 2

Coordinates of Q = (-4, 2).

Answer: (-1, 0) and (-4, 2)



Q7. Solution & Steps

Hint: Given AP/AB = 3/7, so AP : PB = 3 : 4.

Given: AP = (3/7)AB

PB = AB - AP = AB - (3/7)AB = (4/7)AB

Ratio AP : PB = 3 : 4.

Applying section formula for points A(-2, 2) and B(2, -4) with m = 3, n = 4:

x = [3(2) + 4(-2)] / (3 + 4) = (6 - 8) / 7 = -2/7

y = [3(-4) + 4(2)] / (3 + 4) = (-12 + 8) / 7 = -4/7

Coordinates of P = (-2/7, -4/7).

Answer: P(-2/7, -4/7)

Q8. Solution & Steps

Hint: Let line divide AB in ratio k : 1. Find coordinates in terms of k and substitute into line equation.

Let line divide segment joining A(2, -2) and B(3, 7) in ratio k : 1 at point P.

$x = (3k + 2) / (k + 1)$

$y = (7k - 2) / (k + 1)$

Since point P lies on line $2x + y - 4 = 0$:

$2[(3k + 2)/(k + 1)] + [(7k - 2)/(k + 1)] - 4 = 0$

$2(3k + 2) + (7k - 2) - 4(k + 1) = 0$

$6k + 4 + 7k - 2 - 4k - 4 = 0$

$9k - 2 = 0 \Rightarrow 9k = 2 \Rightarrow k = 2/9.$

Therefore, ratio is 2 : 9 internally.

Answer: 2 : 9

Q9. Solution & Steps [HOTS]

Hint: Mid-point coordinates give simultaneous equations for triangle vertices.

Let vertices of triangle ABC be $A(x_1, y_1)$, $B(x_2, y_2)$, and $C(x_3, y_3)$.

D(1, 2) is mid-point of AB $\Rightarrow x_1 + x_2 = 2,\ y_1 + y_2 = 4$

E(0, -1) is mid-point of BC $\Rightarrow x_2 + x_3 = 0,\ y_2 + y_3 = -2$

F(2, -1) is mid-point of CA $\Rightarrow x_3 + x_1 = 4,\ y_3 + y_1 = -2$

Adding all three x-equations:

$2(x_1 + x_2 + x_3) = 2 + 0 + 4 = 6 \Rightarrow x_1 + x_2 + x_3 = 3$

$x_3 = 3 - (x_1 + x_2) = 3 - 2 = 1$

$x_1 = 3 - (x_2 + x_3) = 3 - 0 = 3$

$x_2 = 3 - (x_3 + x_1) = 3 - 4 = -1$

Adding all three y-equations:

$2(y_1 + y_2 + y_3) = 4 + (-2) + (-2) = 0 \Rightarrow y_1 + y_2 + y_3 = 0$

$y_3 = 0 - (y_1 + y_2) = 0 - 4 = -4$

$y_1 = 0 - (y_2 + y_3) = 0 - (-2) = 2$

$y_2 = 0 - (y_3 + y_1) = 0 - (-2) = 2$

Vertices are A(3, 2), B(-1, 2), and C(1, -4).

Answer: A(3, 2), B(-1, 2), C(1, -4)

Q10. Solution & Steps [HOTS]

Hint: Equate $PA^2 = PB^2$ and simplify using standard difference of squares identity.

$PA^2 = [x - (a + b)]^2 + [y - (b - a)]^2$

$PB^2 = [x - (a - b)]^2 + [y - (a + b)]^2$

Given: $PA^2 = PB^2$

$[x - (a + b)]^2 - [x - (a - b)]^2 = [y - (a + b)]^2 - [y - (b - a)]^2$

$x^2 - 2x(a + b) + (a + b)^2 + y^2 - 2y(b - a) + (b - a)^2 = x^2 - 2x(a - b) + (a - b)^2 + y^2 - 2y(a + b) + (a + b)^2$

$> -2x(a + b) - 2y(b - a) = -2x(a - b) - 2y(a + b)$

Answer: bx = ay (Proved)

Video solution link on youtube :

https://youtu.be/nLpdtXgEfkw