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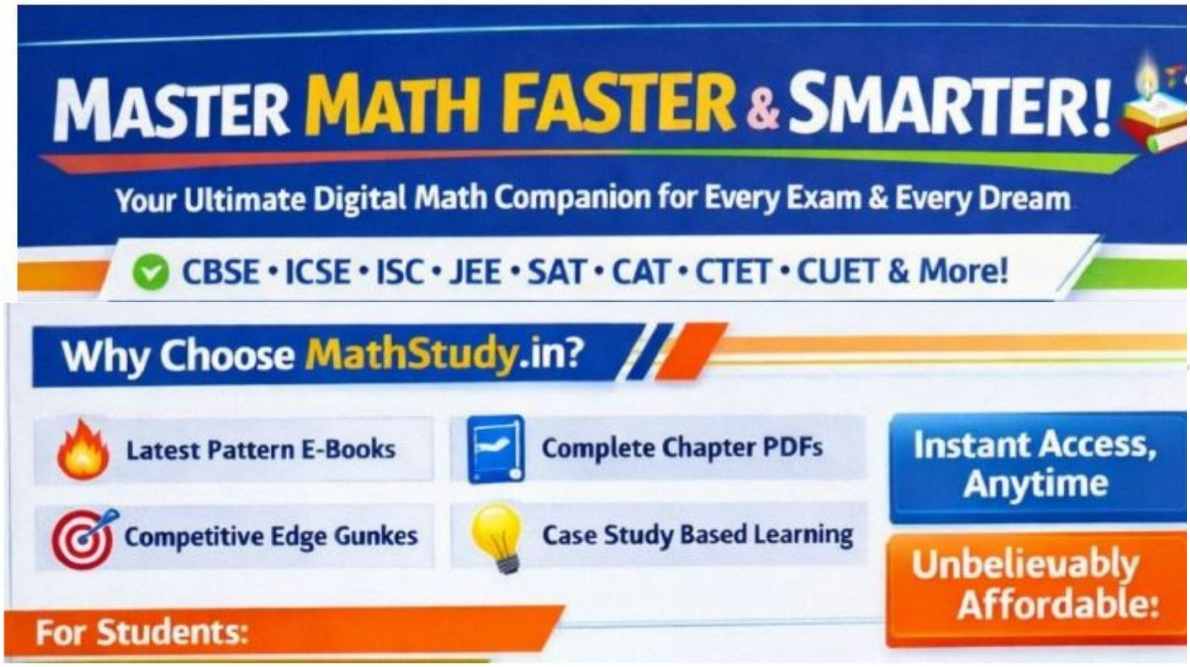

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SOLUTIONS: COORDINATE GEOMETRY (HOTS)

~~Mathematics | Class IX | (2026/COORD/09/HOTS/001)~~

Section A: Multiple Choice Questions

1. **(b) 1.** Abscissa of $P = -2$, Abscissa of $Q = -3$. Difference: $-2 - (-3) = -2 + 3 = 1$.

2. **(a) 4.** Distance from the y-axis is the absolute value of the x-coordinate (abscissa). $|4| = 4$.

3. **(c) (3, 6).** $x + 2 = 5 \implies x = 3$. $y - 2 = 4 \implies y = 6$.

4. **(b) Quadrant II.** Coordinates are $(-3, 2)$. The $(-, +)$ pattern belongs to the 2^{nd} quadrant.

5. **(d) (-4, -4).** 3^{rd} quadrant implies both coordinates are negative. Distance 4 from both axes means $|x| = 4, |y| = 4$.

6. **(b) 8 sq. units.** Area $= \frac{1}{2} \times$ base $\times$ height $= \frac{1}{2} \times 4 \times 4 = 8$.

7. **(b) Rectangle.** Length is 3 units (x-axis) and breadth is 4 units (y-axis). Since sides are unequal and adjacent sides are perpendicular, it is a rectangle.

8. **(d) (+, -).** In the 4^{th} quadrant, x is positive and y is negative.

Section B: Very Short Answer Questions

1. Reflection of (x, y) in x-axis is $(x, -y)$. So, $P' = (\mathbf{3}, \mathbf{-4})$.
   Distance $PP' = \sqrt{(3-3)^2 + (4-(-4))^2} = \sqrt{0 + 8^2} = \mathbf{8}$ units.

2. 2^{nd} quadrant implies $x < 0$ and $y > 0$.
   Therefore, $k < 0$ and $2k > 0$. This is a contradiction unless we consider the magnitude. If the point is in the 2^{nd} quadrant, **k must be negative**.

3. Vertex at origin: $(0, 0)$. Sides along positive axes of length 5.
   Vertices: **(0,0), (5,0), (5,5), and (0,5)**.

4. $ab > 0 \implies$ both a, b are positive OR both are negative.
   $a + b < 0 \implies$ both must be negative.
   Thus, the point lies in the **III Quadrant**.

Section C: Short Answer Questions

1. (i) Line segment AB connects $(1, -1)$ and $(4, 5)$.
   (ii) Mid-point $= (\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}) = (\frac{1+4}{2}, \frac{-1+5}{2}) = (\mathbf{2.5}, \mathbf{2})$.

2. Points: $P(3, 2), Q(-4, 2), R(-4, 5)$.
   PQ is horizontal (length 7). QR is vertical (length 3). To complete the rectangle, the 4^{th} vertex must be 3 units above $P(3, 2)$.
   Coordinates: **(3, 5)**.

3. C is the mid-point since $AC = BC$ and C lies on AB.
   $C = (\frac{-3+1}{2}, \frac{4+4}{2}) = (-1, 4)$.
   Distance $AB = |1 - (-3)| = \mathbf{4}$ units.

Section D: Long Answer / HOTS Questions

1. (i) For a square centered at $(0,0)$ with vertex $A(2,2)$, the vertices must be symmetrical across the axes.
   $B = (-2,2)$, $C = (-2,-2)$, $D = (2,-2)$.
   (ii) Side length $= |2-(-2)| = 4$ units. Area $= 4^2 = \mathbf{16}$ sq. units.
   (iii) Diagonal $AC = \sqrt{(-2-2)^2 + (-2-2)^2} = \sqrt{(-4)^2 + (-4)^2} = \sqrt{32} = \mathbf{4\sqrt{2}}$ units.

2. (i) [Plotting $H(3,4), S(-2,4), L(-2,-1)$]
   (ii) HS is horizontal (length 5). SL is vertical (length 5). The figure $HSLP$ is actually a square.
   To find P: It must have the x-coordinate of H and y-coordinate of L.
   Coordinates of **P: (3, -1)**.
   (iii) Perimeter $= 4 \times$ side $= 4 \times 5 = \mathbf{20}$ units.