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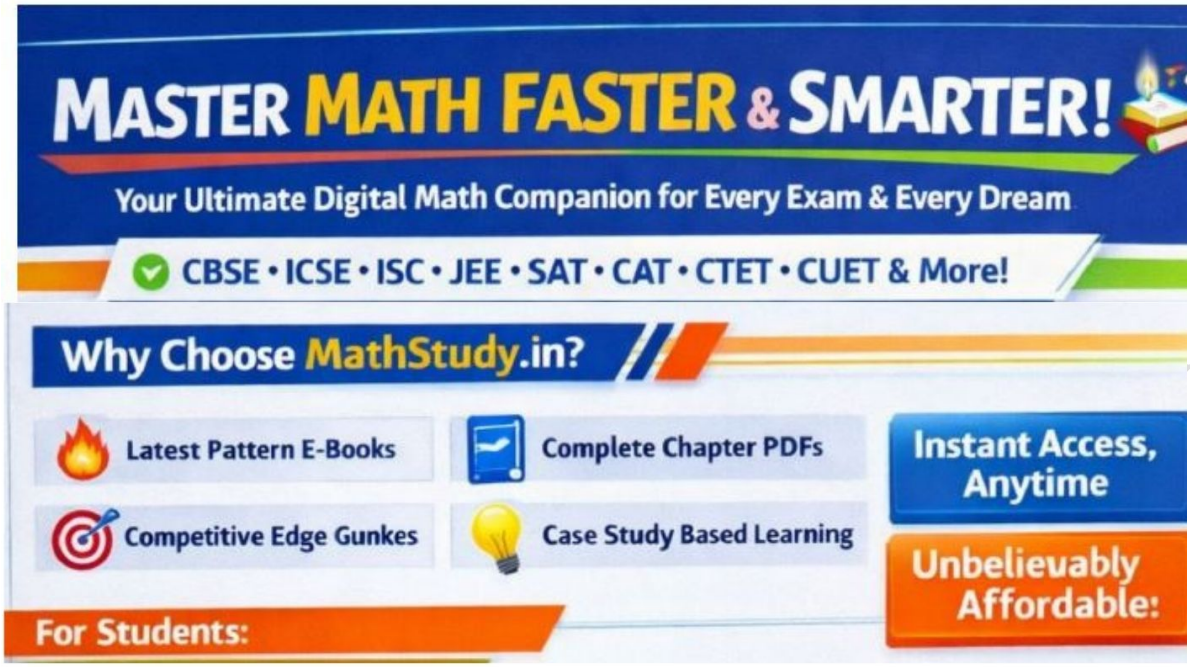

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DETAILED SOLUTIONS: LINEAR EQUATIONS & COORDINATES (HOTS)

Mathematics | Class IX | (2026/LINEQ-HOTS/09/001)

Section A: Multiple Choice Questions

1. **(c) 0.** Since the line passes through $(0,0)$, substitute $x=0, y=0 \implies a(0)+b(0)+c=0 \implies c=0$.
2. **(c) (0, 0).** The equation $y=mx$ is a direct variation passing through the origin.
3. **(a) $y=2x+3$.** Shifting a graph k units up adds k to the constant term.
4. **(d) Infinite.** Through a single point, an infinite number of straight lines can be drawn.
5. **(b) 8 sq. units.** The triangle has vertices $(0,0),(4,0)$, and $(0,4)$. Area $=\frac{1}{2}\times 4\times 4=8$.
6. **(a) 3.** $x+y=6 \implies k+(2k-3)=6 \implies 3k=9 \implies k=3$.
7. **(d) Infinitely many.** A linear equation in two variables has infinite solutions on a line.
8. **(b) $x=-5$.** A line parallel to Y-axis is $x=k$. 5 units left means $k=-5$.

Section B: Very Short Answer Questions

1. $3x+4y=12$.
   For X-axis intercept, put $y=0 \implies 3x=12 \implies x=4$. Point: **(4, 0)**.
   For Y-axis intercept, put $x=0 \implies 4y=12 \implies y=3$. Point: **(0, 3)**.
2. $2x-3y+5=0 \implies 3y=2x+5 \implies \mathbf{y=\frac{2x+5}{3}}$.
   For $(-1,1)$, $LHS=1$; $RHS=\frac{2(-1)+5}{3}=\frac{3}{3}=1$. **Yes, it is a solution.**
3. Substitute $x=2, y=1$ in $(k-2)x+4y=10$:
   $(k-2)2+4(1)=10 \implies 2k-4+4=10 \implies 2k=10 \implies \mathbf{k=5}$.
4. Intersection of $x=2$ and $y=3$ is $(2,3)$. A line parallel to X-axis is of the form $y=k$. Since it passes through $(2,3)$, the equation is $y=3$.

Section C: Short Answer Questions

1. Substitute $x=2k-3$ and $y=k+2$:
   $2(2k-3)+3(k+2)+15=0 \implies 4k-6+3k+6+15=0 \implies 7k+15=0 \implies \mathbf{k=-15/7}$.
2. Comparing $y=2x+1$ and $y=2x-3$: Both have the same slope ($m=2$). Observation: **The lines are parallel** and will never intersect.
3. Let cost of notebook be x and pen be y. Equation: $y=x+5$.
   Solutions: $(10,15),(20,25),(30,35)$.

Section D: Long Answer / HOTS Questions

1. (i) Distance $= x$. Fare for 1st 2 km $= 50$. Subsequent distance $= (x - 2)$.
   Equation: $y = 50 + 15(x - 2) \implies \mathbf{y = 15x + 20}$ (for $x \geq 2$).
   (iii) For $x = 10$, $y = 15(10) + 20 = \mathbf{170}$. Fare is Rs 170.
   (iv) $230 = 15x + 20 \implies 210 = 15x \implies \mathbf{x = 14}$ km.

2. (i) $O(0, 0), A(0, 4), B(6, 4), C(6, 0)$.
   (ii) Mid-point of OB: $(\frac{0+6}{2}, \frac{0+4}{2}) = (\mathbf{3}, \mathbf{2})$.
   (iii) Side AB is a horizontal line through $y = 4 \implies \mathbf{y = 4}$.
   Side BC is a vertical line through $x = 6 \implies \mathbf{x = 6}$.

3. Boundary lines: $x = 1, x = 4, y = 2, y = 5$.
   Vertices: $(1, 2), (4, 2), (4, 5), (1, 5)$.
   Lengths: Horizontal sides $= 4 - 1 = 3$ units. Vertical sides $= 5 - 2 = 3$ units.
   Since all sides are equal and adjacent sides are perpendicular, the figure is a **Square**.
   Area $= 3 \times 3 = \mathbf{9}$ sq. units.