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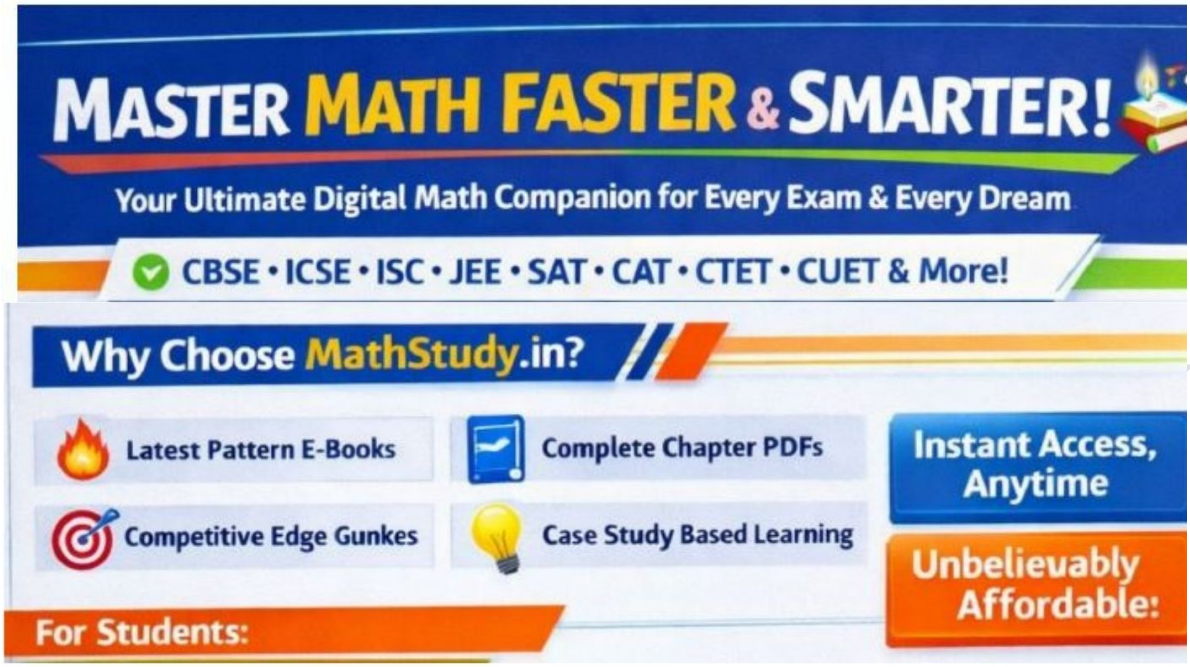

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SOLUTIONS: LINEAR EQUATIONS IN TWO VARIABLES

Mathematics | Class IX (2026/LINEQ/09/002)

Section A (Multiple Choice Questions)

1. **(c)** $x + y = 0$**.** If the point is $(a, -a)$, then $x = a$ and $y = -a$. Adding them gives $x + y = a + (-a) = 0$.

2. **(c) Infinitely many.** Through any single point $(2, 3)$, an infinite number of lines can be drawn.

3. **(a) 3.** Substitute $x = 1, y = 1$: $9k(1) + 12k(1) = 63 \implies 21k = 63 \implies k = 3$.

4. **(b) Y-axis.** The equation $x = a$ represents all points with a fixed x-distance, forming a vertical line.

5. **(b)** $c = 0$**.** A line passes through the origin $(0, 0)$ if $0 = m(0) + c$, which implies $c = 0$.

6. **(a)** $(-9/2, n)$**.** $2x + 9 = 0 \implies x = -9/2$. Since the coefficient of y is 0, y can be any real number n.

7. **(b) Parallel to Y-axis.** $x - 2 = 0 \implies x = 2$, which is a vertical line.

8. **(a)** 5/3**.** Substitute $(3, 4)$: $3(4) = a(3) + 7 \implies 12 = 3a + 7 \implies 5 = 3a \implies a = 5/3$.

Section B (Very Short Answer Questions)

1. **Standard Form:** $1x - 3y + 0 = 0$.
   Intersections: Put $x = 0 \implies y = 0$; Put $y = 0 \implies x = 0$. It intersects both axes at the **Origin (0, 0)**.

2. Substitute $x = -1, y = -1$ into $2x - ky = 9$:
   $2(-1) - k(-1) = 9 \implies -2 + k = 9 \implies \mathbf{k = 11}$.

3. Any two lines passing through $(0, 4)$ can be written. Examples:
   (i) $x + y = 4$ (ii) $y = 4$ (or $2x + y = 4$).

4. $2x + 9 = 0 \implies 2x + 0y + 9 = 0$.
   Geometric representation: A **vertical line** passing through $x = -4.5$ on the Cartesian plane.

Section C (Short Answer Questions)

1. $10(2k - 1) - 9k = 12 \implies 20k - 10 - 9k = 12 \implies 11k = 22 \implies \mathbf{k = 2}$.
   Equation becomes $10x - 9y = 12$. Another solution (let $y = 2$): $10x - 18 = 12 \implies 10x = 30 \implies x = 3$. Solution: **(3, 2)**.

2. $y = 1.5x + 1$. Solutions: **(0, 1), (2, 4), (-2, -2)**.
   Since the solution $(-2, -2)$ exists, **Yes**, the line passes through the III quadrant.

3. $F \propto a \implies F = ma$. Given $m = 5$, equation is $y = 5x$.
   When acceleration $x = 2$, Force $y = 5(2) = \mathbf{10}$ units.

Section D (Long Answer Questions)

1. **Graph of $x + 2y = 6$:** (i) Cuts X-axis at **(6, 0)**; cuts Y-axis at **(0, 3)**.
   (ii) Area $= \frac{1}{2} \times$ base $\times$ height $= \frac{1}{2} \times 6 \times 3 =$ **9** sq. units.
   (iii) At $(2, 2)$: $2 + 2(2) = 6$. LHS = RHS. **Yes**, it is a solution.

2. (i) [Graphing $y = x$ and $y = -x$].
   (ii) They intersect at the **Origin (0, 0)**.
   (iii) Ordinate is $y = 3$. For $y = x$, point is **(3, 3)**. For $y = -x$, point is **(-3, 3)**.

Section E (Case Study Based Question)

1. **(a)** $86°F$**.** $F = \frac{9}{5}(30) + 32 = 54 + 32 = 86$.

2. **(b) -40.** Let $F = C = x$. $x = \frac{9}{5}x + 32 \implies -\frac{4}{5}x = 32 \implies x = -40$.

3. **(b)** $32°F$**.** $F = \frac{9}{5}(0) + 32 = 32$.

4. **(c) -9/5.** In the form $F - \frac{9}{5}C - 32 = 0$, the coefficient of C is $-9/5$.

5. **(a)** $35°C$**.** $95 = \frac{9}{5}C + 32 \implies 63 = \frac{9}{5}C \implies C = \frac{63 \times 5}{9} = 35$.