SECTION A

1. **Choose and write the correct option in the following questions.** $(3 \times 1 = 3)$

   (i) The equation $x = 4$ in two variables can be written as

   (a) $1.x + 1.y = 4$ (b) $x + 0.y = 4$

   (c) $0.x + 1.y = 4$ (d) $0.x + 0.y = 4$

   (ii) The linear equation $2x - 4y = 8$ has

   (a) a unique solution   (b) two solutions

   (c) infinitely many solutions   (d) no solution

   (iii) The graph of the linear equation $2x + 3y = 8$ cuts the x-axis at the point

   (a) $\left(\dfrac{8}{3}, 0\right)$ (b) $(0, 4)$

   (c) $(4, 0)$ (d) $\left(0, \dfrac{8}{3}\right)$

■ **Solve the following questions.** $(2 \times 1 = 2)$

2. (i) Write the axes on which the graph of line $x = -2$ is (a) parallel (b) perpendicular.

   (ii) Total number of legs in a herd of goats and hens is 40. Write the equation and represent this situation in the form of a linear equation in two variables.

SECTION B

■ **Solve the following questions.** $(4 \times 2 = 8)$

3. For the graph of the linear equation $ax + by + c = 0$ to pass through origin, which of the three a, b and c is necessarily zero? Write an equation of a line which passes through the origin.

4. Find three solutions of the equation $2x + 3y = 5$.

5. If the point $(4, -2)$ lies on the graph of $2x = ay + 3$, then find the value of a.

6. Express y in terms of x and check whether the point $(-3, -2)$ lies on the line $3x - 2y + 5 = 0$ or not.

■ **Solve the following questions.** (4 × 3 = 12)

7. Express the following linear equation in the form $ax + by + c = 0$ and indicate the value of a, b and c: $\frac{x}{2} + y - 5 = 0$. Find any one solution of the equation.

8. Solve for x: $3x + 11 + \frac{x}{2} = \frac{-7}{2} + 18$. What will be the graph of the equation?

9. Check by substituting whether $x = -6$ and $y = -3$ is a solution of equation $2(x - 1) - 5y = 1$ or not. Find one more solution. How many more solutions can you find?

10. Draw the graph of the linear equation $2x = y + 3$. At what points the graph of the equation cu the x-axis and the y-axis?

■ **Solve the following questions.** (3 × 5 = 1:

11. The cost of petrol in a city is ₹50 per litre. Set up a linear equation with x representing the numb of litres and y representing the total cost (in rupees). Also draw its graph.

12. Draw the graph of $x = 3y - 4$. Find the:

    (i) value of y when $x = -1$.

    (ii) value of x when $y = 5$.

13. Find the value of k, if $x = 2, y = 1$ is a solution of the equation $3x - 2y = k$ and then

    (i) find any two solutions of the equation formed.

    (ii) write equations of two lines passing through the point $(2, 1)$.

IX | HW—10 (Answers)

1. (i) $x + 0y = 4$ (b)
   (ii) infinitely many solutions (c)
   (iii) put $y = 0$, $2x = 8$
   $$x = 4$$
   ∴ the required point is $(4, 0)$ (c)

2. $x = -2$ is a line parallel to y-axis and perpendicular to x-axis.
   Let the no. of goats be x and no. of hens be y.
   ATQ, $4x + 2y = 40$ $\overset{(\div 2)}{\Rightarrow}$ $2x + y = 20$
   $\Rightarrow 2x + y - 20 = 0$ is the required linear equation of the form $ax + by + c = 0$; where $a = 2$, $b = 1$, $c = -20$.

3. For the graph of $ax + by + c = 0$ to pass through origin, C is necessarily zero.
   $x = y$ or $x - y = 0$ is an equation of a line passing through the origin.

4. $2x + 3y = 5$
   $$3y = 5 - 2x$$
   $$y = \frac{5 - 2x}{3}$$

   when $x = 0$, $y = \frac{5}{3}$

   when $x = 1$, $y = \frac{5 - 2}{3} = \frac{3}{3} = 1$

   when $x = 2$, $y = \frac{5 - 4}{3} = \frac{1}{3}$

   ∴ The required three solutions are $\left(0, \frac{5}{3}\right)$, $(1, 1)$ and $\left(2, \frac{1}{3}\right)$

5) when $x = 4$, $y = -2$, $2 \times 4 = a \times (-2) + 3$
   $$\Rightarrow 8 = -2a + 3$$
   $$\Rightarrow -2a = 8 - 3$$
   $$\Rightarrow -2a = 5$$
   $$a = \frac{-5}{2}$$

6) $3x - 2y + 5 = 0$
   $$3x + 5 = 2y$$
   $$y = \frac{3x + 5}{2}$$

When $x = -3$ and $y = -2$,

LHS, $3x - 2y + 5 = 3(-3) - 2(-2) + 5 = -9 + 4 + 5 = -9 - 9 = 0$, RHS

Hence $(-3, -2)$ lies on the line $3x - 2y + 5 = 0$

7. $\frac{x}{2} + y - 5 = 0$

$\Rightarrow x + 2y - 10 = 0$ is in the form $ax + by + c = 0$; where $a = 1$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\; b = 2$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\; c = -10.$

$\qquad 2y = 10 - x$

$\qquad y = \frac{10 - x}{2}$

When $x = 0$, $y = \frac{10}{2} = 5$

$\qquad\therefore (0, 5)$ is a solution of the given equation.

8. $3x + 11 + \frac{x}{2} = -\frac{7}{2} + 18$

$\Rightarrow \frac{6x + 22 + x}{21} = \frac{-7 + 36}{21}$

$\Rightarrow 7x + 22 = 29$

$\Rightarrow \qquad 7x = 7$

$\qquad\therefore x = 1$, is a line parallel to y-axis

9. When $x = -6, y = -3,$

LHS, $2(x - 1) - 5y = 2(-6 - 1) - 5(-3) = 2 \times -7 + 15 = -14 + 15 = 1$, RHS

$\therefore x = -6, y = -3$ is a solution of the given equation.

$\quad 2(x - 1) - 5y = 1$

$\Rightarrow 2x - 2 - 5y = 1$

$\Rightarrow 2x - 5y = 3$

$\Rightarrow \quad 2x - 3 = 5y$

$\qquad y = \frac{2x - 3}{5}$

When $x = 0$, $y = -\frac{3}{5}$

$\qquad\therefore (0, -\frac{3}{5})$ is a solution of the given equation.

We can find infinitely many more solutions.

10. $2x = y + 3$

$\Rightarrow y = 2x - 3$

x	0	1	2
y	-3	-1	1

When $x = 0, y = -3$

When $x = 1, y = 2 - 3 = -1$

When $x = 2, y = 4 - 3 = 1$

From the graph:-

the line cuts the x-axis at $\left(\frac{3}{2}, 0\right)$ and y-axis at $(0, -3)$

11. ATQ, $y = 50x$

$\Rightarrow 50x - y + 0 = 0$ is the required linear equation in the form $ax + by + c = 0$.

$y = 50x$

x	0	1	2
y	0	50	100

12. $x = 3y - 4$

$3y = x + 4$

$y = \dfrac{x + 4}{3}$

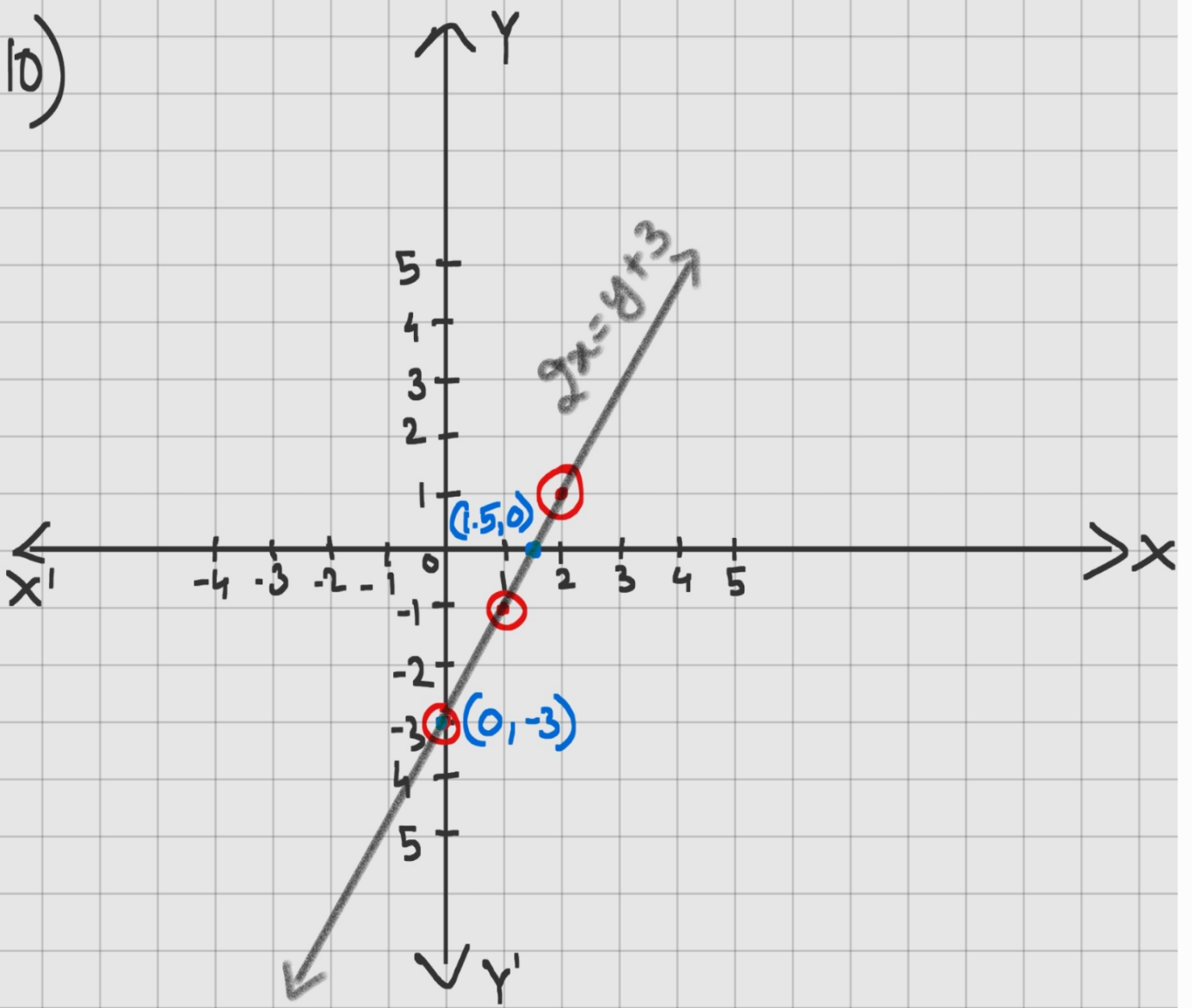| x	2	5	-1
y	2	3	1

When $x = 2, y = \dfrac{2 + 4}{3} = \dfrac{6}{3} = 2$

When $x = 5, y = \dfrac{5 + 4}{3} = \dfrac{9}{3} = 3$

When $x = -1, y = \dfrac{-1 + 4}{3} = \dfrac{3}{3} = 1$
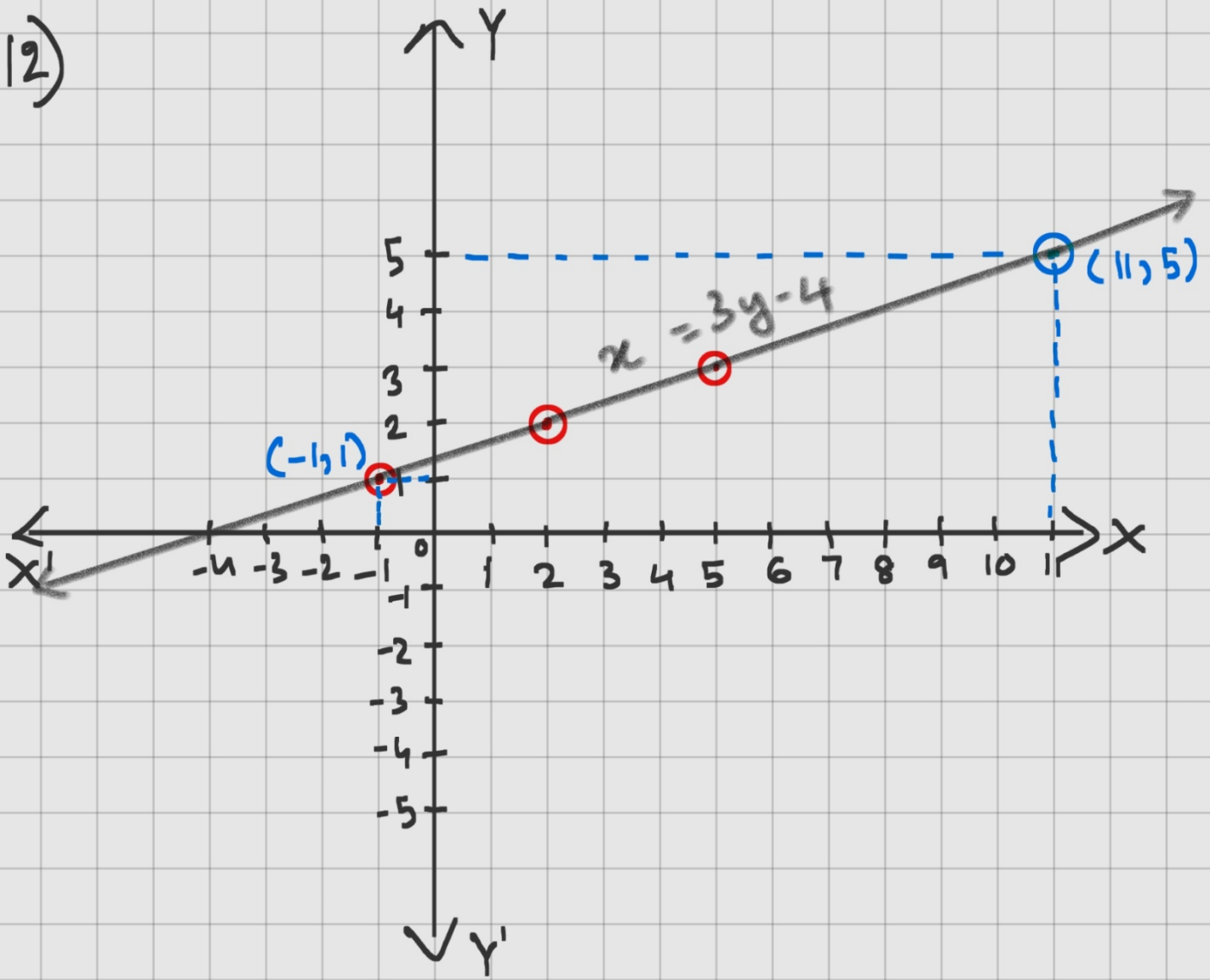
From the graph:- when $x = -1, y = 1$

when $y = 5, x = 11$

10)

$2x = y + 3$

(1.5, 0)

(0, -3)

11)

y = 50x

12)

$x = 3y - 4$

$(-1, 1)$
$(11, 5)$
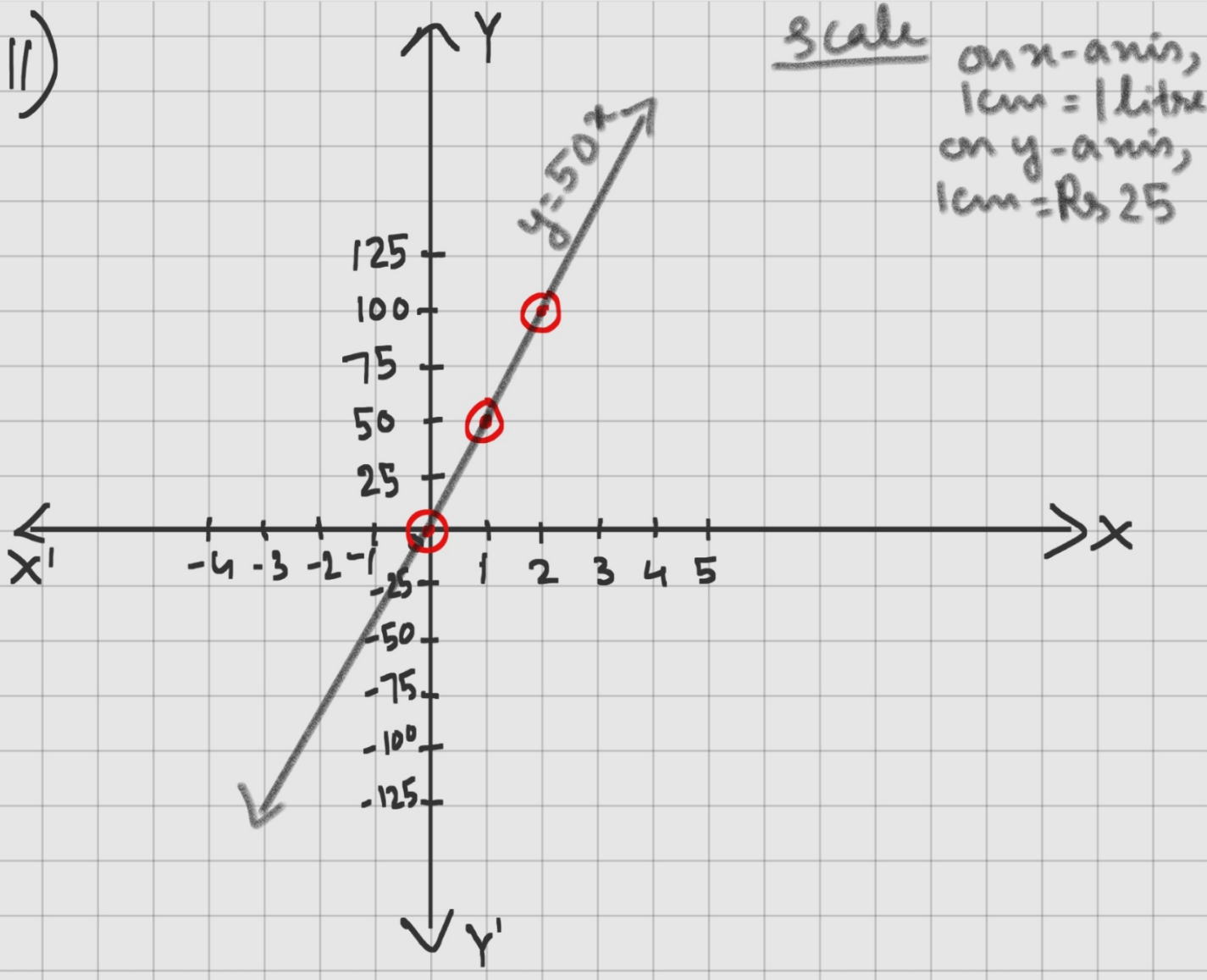
13) When $x = 2, y = 1$, $3x - 2y = k$

$$\Rightarrow 3 \times 2 - 2 \times 1 = k$$
$$\Rightarrow \therefore k = 6 - 2 = \underline{\underline{4}}$$

Thus, the equation is $3x - 2y = 4$

$$\Rightarrow 3x - 4 = 2y$$
$$\therefore y = \frac{3x - 4}{2}$$

(i) When $x = 0$, $y = -\frac{4}{2} = -2$

when $x = 1$, $y = \frac{3-4}{2} = -\frac{1}{2}$

$\therefore$ Two solutions are $(0, -2)$ and $(1, -\frac{1}{2})$

(ii) Equations of two lines passing through $(2,1)$ are

$$x + y = 3$$
$$x - y = 1$$

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