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PRACTICE PAPER 05 (2024-25)
CHAPTER 04 LINEAR EQUATION IN TWO VARIABLES
(ANSWERS)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**
CLASS : IX **DURATION : 1½ hrs**

General Instructions:
(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

SECTION – A
Questions 1 to 10 carry 1 mark each.

1. The equation x = 5 in two variables can be written as
(a) 1.x + 1.y = 5 (b) 0.x + 1.y = 5 (c) 0.x + 0.y = 5 (d) 1.x + 0.y = 5
Ans: (d) 1.x + 0.y = 5

2. x = 5, y = –2 is a solution of the linear equation
(a) 2x + y = 9 (b) 2x – y = 12(c) x + 3y = 1 (d) x + 3y = 0
Ans: (b) 2x – y = 12
Substituting x = 5 and y = –2 in LHS of 2x – y = 12,
we have
LHS = 2 × 5 – (–2) = 10 + 2 = 12 = RHS

3. If the linear equation has solutions (– 3, 3), (0, 0), (3, – 3), then equation is
(a) x – y = 0 (b) x + y = 0 (c) 2x – y = 0 (d) x + 2y = 0
Ans: (b) x + y = 0

4. If point (3, 0) lies on the graph of the equation 2x + 3y = k, then the value of k is
(a) 6 (b) 3 (c) 2 (d) 5
Ans: (a) 6
On putting x = 3 and y = 0 in the equation 2x + 3y = k, we have
2 × 3 + 3 × 0 = k
⇒ 6 + 0 = k ⇒ k = 6

5. The graph of the linear equation 3x + 5y = 15 cuts the x-axis at the point
(a) (5, 0) (b) (3, 0) (c) (0, 5) (d) (0, 3)
Ans: (a) (5, 0)
At x-axis, y = 0
On putting y = 0 in 3x + 5y = 15, we have
⇒ 3x + 5 × 0 = 15 ⇒ 3x = 15 ⇒ x = 5

6. Any solution of the linear equation 2x + 0y = 9 in two variables, is of the form
(a) $\left(\frac{9}{2},0\right)$ (b) $\left(\frac{9}{2},n\right)$, n is a real number
(c) $\left(n,\frac{9}{2}\right)$, n is a real number (d) $\left(0,\frac{9}{2}\right)$

Ans: (b) $\left(\frac{9}{2}, n\right)$, n is a real number

7. The equation of x-axis is of the form

(a) $x = 0$ (b) $y = 0$ (c) $x + y = 0$ (d) $x = y$

Ans: (b) $y = 0$

8. The point on the graph of the equation $2x + 5y = 20$, where x-coordinate is $\frac{5}{2}$, is

(a) $\left(3, \frac{5}{2}\right)$ (b) $\left(\frac{5}{2}, \frac{5}{2}\right)$ (c) $\left(\frac{5}{2}, 0\right)$ (d) $\left(\frac{5}{2}, 3\right)$

Ans: (d) $\left(\frac{5}{2}, 3\right)$

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

9. **Assertion (A):** The linear equation in two variables is represented by $ax + by + c = 0$. Where a, b, and c are the whole numbers.
Reason (R): The linear equation in two variables have infinitely many solutions.
Ans: (d) A is false but R is true.
The linear equation in two variables is represented as $ax + by + c = 0$ where a, b, and c are real numbers, and $a \neq 0$ and $b \neq 0$.
Since, whole numbers start from 0, but a, b should not be equal to zero because this will make a linear equation in one variable.

10. **Assertion (A):** If $x = 2$ and $y = 3$ is a solution of the equation $ax + y = 15$, then the value of a is 6.
Reason (R): The solution of a line needs to satisfy the equation of the line.
Ans: (a) Both A and R are true and R is the correct explanation of A.
Given: $x = 2$, $y = 3$ is a solution of $ax + y = 15$
Put the values of x and y coordinates in the above equation, we get
$\Rightarrow a(2) + 3 = 15 \Rightarrow a(2) = 12 \Rightarrow a = 6$
Thus, the value of a is 6.
Now, the given equation will be $6x + y = 15$.
Now, substitute the values of $x = 2$ and $y = 3$, the equation $6x + y = 15$
$6 \times 2 + 3 = 12 + 3 = 15 =$ R.H.S.
Hence, the solution of a line needs to satisfy the equation of the line.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. The sum of a two-digit number and the number obtained by reversing the order of its digits is 88. Express this information in linear equation.
Ans: Let unit's digit be x and ten's digit be y.
then original number be $(10y + x)$
after reversing the order of digits new number be $(10x + y)$
According to question,
$10y + x + 10x + y = 88$

$11x + 11y = 88$
$x + y = 8$ (dividing both sides by 11)

12. Write $3x + 2y = 18$ in the form of $y = mx + c$. Find the value of m and c. Is (4, 3) lies on this linear equation?
Ans: Given: 3x + 2y = 18

$$y = \frac{18-3x}{2} = -\frac{3}{2}x+9 \quad ...(i)$$

On comparing, we get m = $-\frac{3}{2}$ and c = 9

Substitute x = 4 in (i), we get y = $-\frac{3}{2} \times 4 + 9 = -6 + 9 = 3$

Hence, point (4, 3) lies on 3x + 2y = 18.

13. Find the value of a, if the line $5y = ax + 10$, will pass through (i) (2, 3), (ii) (1, 1).
Ans: $5y = ax + 10$
(i) On putting $x = 2$ and $y = 3$ in the given equation, we have
$5 \times 3 = a \times 2 + 10 \Rightarrow 15 = 2a + 10$
$\Rightarrow 15 - 10 = 2a$
$\Rightarrow 2a = 5 \Rightarrow a = \frac{5}{2}$
(ii) On putting $x = 1$ and $y = 1$ in the given equation, we have
$5 \times 1 = a \times 1 + 10$
$\Rightarrow 5 = a + 10 \Rightarrow a = 5 - 10 \Rightarrow a = -5$

14. Find the solution of the linear equation x + 2y = 8 which represents a point on the: (i) x-axis (ii) y-axis
Ans: (i) For x-axis, $y = 0$
On putting $y = 0$ in $x + 2y = 8$, we have
$x + 2 \times 0 = 8 \Rightarrow x = 8$
(ii) For y-axis, $x = 0$
On putting $x = 0$ in $x + 2y = 8$, we have $0 + 2y = 8 \Rightarrow y = 4$
Hence, point (8, 0) is a point on x-axis and point (0, 4) is a point on y-axis.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Find the value of a, if the line $3y = ax + 7$, will pass through:
(i) (3, 4), (ii) (1, 2), (iii) (2, –3)
Ans: $3y = ax + 7$
(i) Putting $x = 3$ and $y = 4$ in the given equation of line, we have
$3 \times 4 = a \times 3 + 7 \Rightarrow 12 = 3a + 7 \Rightarrow 3a = 12 - 7$
$\Rightarrow 3a = 5 \Rightarrow a = \frac{5}{3}$
(ii) Putting $x = 1$ and $y = 2$ in the given equation of line, we have
$3 \times 2 = a \times 1 + 7 \Rightarrow 6 = a + 7 \Rightarrow a = 6 - 7 \Rightarrow a = -1$
(iii) Putting $x = 2$ and $y = -3$ in the given equation, we have
$3 \times (-3) = a \times 2 + 7 \Rightarrow -9 = 2a + 7 \Rightarrow 2a = -9 - 7$
$\Rightarrow 2a = -16 \Rightarrow a = \frac{-16}{2} \Rightarrow a = -8$

16. Show that the points A (1, 2), B (–1, –16) and C (0, –7) lie on the graph of the linear equation $y = 9x - 7$.

Ans: $y = 9x - 7$
or $9x - y = 7$ ...(i)
On putting $x = 1$, $y = 2$ in (i), we have
$9 \times 1 - 2 = 7 \Rightarrow 9 - 2 = 7$
$\Rightarrow 7 = 7$, true.
Therefore, (1, 2) is a solution of linear equation $y = 9x - 7$.
On putting $x = -1$, $y = -16$ in (i), we have
$9 \times (-1) - (-16) = 7 \Rightarrow -9 + 16 = 7$
$\Rightarrow 7 = 7$, true.
Therefore, (– 1, – 16) is a solution of linear equation $y = 9x - 7$.
On putting $x = 0$, $y = -7$ in (i), we have
$9 \times 0 - (-7) = 7 \Rightarrow 0 + 7 = 7$
$\Rightarrow 7 = 7$, true.
Therefore, (0, –7) is a solution of linear equation $y = 9x - 7$.

17. For what value of p; $x = 2$, $y = 3$ is a solution of $(p + 1)x - (2p + 3)y - 1 = 0$?
(i) Write the equation.
(ii) Is this line passes through the point (–2, 3)? Give justification.
Ans: Given: $(p + 1)x - (2p + 3)y - 1 = 0$ ...(i)
Put $x = 2$ and $y = 3$ in (i), we get
$(p + 1)2 - (2p + 3)3 - 1 = 0$
$\Rightarrow 2p + 2 - 6p - 9 - 1 = 0$
$\Rightarrow -4p + 2 - 10 = 0$
$\Rightarrow -4p = 8$
$\Rightarrow p = -2$
(i) Substitute the value of p in (i), we get
$(-2 + 1)x - [2(-1) + 3]y - 1 = 0$
$\Rightarrow -x - y - 1 = 0$
$\Rightarrow x + y + 1 = 0$ ...(ii)
(ii) Substitute $x = -2$ and $y = 3$ in L.H.S. of (ii), we have
L.H.S. $= -2 + 3 + 1 = 2 \neq$ R.H.S.
Hence, the line $x + y + 1 = 0$ will not pass through the point (–2, 3).

SECTION – D

Questions 18 carry 5 marks each.

18. (i) If the point (4, 3) lies on the linear equation $3x - ay = 6$, find whether (–2, –6) also lies on the same line? (2)
(ii) Find the coordinate of the point lies on above line (a) abscissa is zero (b) ordinate is zero (1)
(iii) The points A(a, b) and B(b, 0) lie on the linear equation $y = 8x + 3$. Find the value of a and b. (2)
Ans:
(i) If point (4, 3) lies on $3x - ay = 6$, then
$3 \times 4 - a \times 3 = 6$
$\Rightarrow 12 - 3a = 6$
$\Rightarrow -3a = 6 - 12 = -6$
$\Rightarrow 3a = 6$
$\Rightarrow a = 2$
So, linear equation became $3x - 2y = 6$ ...(i)
Substitute $x = -2$ and $y = -6$ in L.H.S. of (i), we get
L.H.S. $= 3 \times (-2) - 2 \times (-6) = -6 + 12 = 6 =$ R.H.S.
Hence, (–2, –6) lies on the line $3x - 2y = 6$
(ii) (a) When abscissa is zero, it means $x = 0$.
From (i), we get

$3 \times 0 - 2 \times y = 6$
$\Rightarrow - 2y = 6$
$\Rightarrow y = - 3$
$\therefore$ Required point is (0, –3)
(b) When ordinate is zero. i.e. $y = 0$
From (i), we get $3x - 2 \times 0 = 6 \Rightarrow x = 2$
$\therefore$ Required point is (2, 0)
(iii) Given: $y = 8x + 3$ ...(i)
On putting $x = a$ and $y = b$ in (i), we have
$b = 8a + 3$ ...(ii)
On putting $x = b$ and $y = 0$ in (i), we have
$0 = 8b + 3 \Rightarrow b = \frac{-3}{8}$
By putting $b = \frac{-3}{8}$ in (ii), we have $\frac{-3}{8} = 8a + 3$
$\Rightarrow \frac{-3}{8} - 3 = 8a \Rightarrow \frac{-27}{8} = 8a \Rightarrow a = \frac{-27}{64}$

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Christmas is celebrated on 25 December every year to remember the birth of Jesus Christ, who Christians believe is the son of God. Santa Claus, also known as the Father of Christmas, is a legendary character originating in western Christian culture and he brings gifts for everyone on Christmas. Let Santa Claus brings 3 chocolates for each child and 2 chocolates for each adult present at the Christmas party at Michael's home along with a Christmas cake. He distributes total 90 chocolates among all.

(a) How to represent the above situation in a linear equation in two variables by taking the number of children as x and the number of adults as y? If the number of children is 10, then find the number of adults at the Christmas party.
(b) Find the value of k, if x = 5, y = 1 is a solution of the equation 5x + 7y = k.
(c) Write the standard form of the linear equation y – x = 7.
Ans: (a) Here, the number of children is x and the number of adults is y at the Christmas party.
Then, the linear equation in two variables for the given statement is,
$3x + 2y = 90$
Given, the number of children is 10.
Therefore, $x = 10$
Put $x = 10$ in the above equation, we get,
$3(10) + 2y = 90 \Rightarrow 30 + 2y = 90 \Rightarrow 2y = 60 \Rightarrow y = 30$
Thus, the number of adults at the christmas party is 30.

(b) Given: $5x + 7y = k$ and $x = 5$, $y = 1$

Substituting these values in the given equation, we get

$5x + 7y = k$

$\Rightarrow 5 \times (5) + 7 \times (1) = k$

$\Rightarrow k = 25 + 7$

$\Rightarrow k = 32$

(c) The standard form of the linear equation in two variables is $ax + by - c = 0$ where a, b and c are real numbers, and $a \neq 0$ and $b \neq 0$.

Here, $y - x = 7$

The standard form will be, $y - x = 7$

$\Rightarrow -x + y - 7 = 0$

$\Rightarrow (-1)x + (1)y - 7 = 0$

20. On his birthday, Manoj planned that this time he celebrates his birthday in a small orphanage centre. He bought apples to give to children and adults working there. Manoj donated 2 apples to each children and 3 apples to each adult working there along with Birthday cake. He distributed 60 total apples.

(a) Taking the number of children as ‘x’ and the number of adults as ‘y’. Represent the above situation in linear equation in two variables.

(b) If the number of children is 15, then find the number of adults.

(c) If the number of adults is 12, then find the number of children.

(d) If $x = -5$ and $y = 2$ is a solution of the equation $3x + 5y = b$, then find the value of ‘b’

Ans: (a) Let the number of children be x. Let the number of adult be y.

According to given condition 2x apples to each children + 3x apples to each adult

$2x + 3y = 60$

(b) Given linear equation is $2x + 3y = 60$ [From (a)]

Now, put $x = 15$

$\Rightarrow 2 \times 15 + 3y = 60$

$\Rightarrow 30 + 3y = 60 \Rightarrow 3y = 60 - 30 \Rightarrow 3y = 30 \Rightarrow y = 10$

Hence, number of adults is 10.

(c) Since, number of adults is 12.

Therefore, $y = 12$

Now, put $y = 12$ in given equation $2x + 3y = 60$ we get, $2x + 3 \times 12 = 60$

$\Rightarrow 2x + 36 = 60 \Rightarrow 2x = 60 - 36 \Rightarrow 2x = 24 \Rightarrow x = 12$

Hence, number of children is 12.

(d) Given equation is $3x + 5y = b$

On putting the values of $x = -5$ and $y = 2$ in the equation, we get

$3(-5) + 5 \times 2 = b$

$\Rightarrow -15 + 10 = b \Rightarrow b = -5$