WORKSHEET 1

CHAPTER 3 – PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1. Solve the pair of linear equations by elimination method:
   (*i*) $10x + 3y = 75, 6x - 5y = 11$ (*ii*) $11x + 5y + 23 = 0, 7x - 2y - 20 = 0$
2. Show graphically that the system of equations

   $3x - y = 2, 9x - 3y = 6,$

   has an infinite number of solutions.
3. Show that $x = 3, y = 2$ is not a solution of the system of linear equations:

   $3x - 2y = 5$

   $2x + y = 7.$
4. Find the values of m and n for which the following system of linear equations has infinitely many solutions:

   $3x + 4y = 12$

   $(m + n)x + 2(m - n)y = 5m - 1$
5. A boat goes 16 km upstream and 24 km downstream in 6 hours. Also, it covers 12 km upstream and 36 km downstream in the same time. Find the speed of the boat in still water and that of the stream.
6. In a ΔABC, $\angle C = 3\angle B = 2(\angle A + \angle B)$. Find the angles.
7. Solve the systems of equations by the method of cross multiplication:
   (*i*) $2x + 3y - 17 = 0, 3x - 2y - 6 = 0$ (*ii*) $4x - 7y + 28 = 0, 5y - 7x + 9 = 0$
   (*iii*) $ax + by = a - b, bx - ay = a + b$ (*iv*) $x + y = a + b, ax - by = a^2 - b^2$
8. In each of the following system of equations, determine whether the system has a unique solution, no solution or infinitely many solutions. In case, there is a unique solution, find it:
   (*i*) $x - 3y = 3, 3x - 9y = 2$ (*ii*) $2x + y = 5, 4x + 2y = 10$
   (*iii*) $3x - 5y = 20, 6x - 10y = 40$ (*iv*) $x - 2y = 8, 5x - 10y = 10$
9. Solve the following system of linear equations graphically

   $2x - y - 4 = 0$

   $x + y + 1 = 0.$

   Find the points where the lines meet y-axis.
10. Draw the graphs of the following equations:

    $2x - y - 2 = 0$

    $4x + 3y - 24 = 0$

    $y + 4 = 0$

    Obtain the vertices of the triangle so obtained and then find its area.
11. Find the value(s) of k for which the system of equations

    $kx - y = 2$

    $6x - 2y = 3$

    has (*i*) a unique solution (*ii*) no solution (*iii*) infinitely many solutions.

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12. Obtain the condition for the following system of linear equations to have a unique solution.

$ax + by = c$

$lx + my = n$

13. Solve the following system of equations:

(*i*) $\frac{x}{7} + \frac{y}{3} = 5, \frac{x}{2} - \frac{y}{a} = 6$ (*ii*) $\frac{x}{3} + \frac{y}{4} = 11, \frac{5}{6}x - \frac{y}{3} = -7$ (*iii*) $\frac{4}{x} + 3y = 8, \frac{6}{x} - 4y = -5$

14. Show graphically that the system of equations

$2x + 4y = 10$

$3x + 6y = 12$

has no solution.

15. Draw the graphs of the following equations on the same graph paper

$2x + y = 2$

$2x + y = 6$

Find the co-ordinate of the vertices of the trapezium formed by these lines. Also, find the area of the trapezium so formed.

16. A lady has only 20-paisa coins and 25-paisa coins in her purse. If she has 50 coins in all totalling ₹ 11.50, how many coins of each kind does she have?

17. The difference between two numbers is 14 and the difference between their squares is 448. Then, find the numbers.

18. If 2 is added to the numerator of a fraction, it reduces to $\frac{1}{2}$ and if 1 is subtracted from the denominator, it reduces to $\frac{1}{3}$. Find the fraction.

19. The length of a room exceeds its breadth by 3 metres. If the length is increased by 3 metres and the breadth is decreased by 2 metres, the area remains the same. Find the length and breadth of the room.

20. If twice the son's age in years is added to the mother's age, the sum is 70 years. But, if twice the mother's age is added to the son's age, the sum is 95 years. Find the age of the mother and that of the son.

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ANSWERS

WORKSHEET 1

1. (*i*) $x = 6, y = 5$. (*ii*) $x = 2, y = -3$.

4. $m = 5, n = 1$

5. Speed of the boat in still water = 8 km/hr.

Speed of the stream = 4 km/hr.

6. $\angle A = 20°$, $\angle B = 40°$ and $\angle C = 120°$.

7. (*i*) $x = 4$ and $y = 3$ (*ii*) $x = 7$ and $y = 8$
(*iii*) $x = 1$ and $y = -1$ (*iv*) $x = a$ and $y = b$

8. (*i*) No solution. (*ii*) Infinitely many solutions.
(*iii*) Infinitely many solutions. (*iv*) No solution.

9. $x = 1, y = -2$

The lines meet y-axis at $(0, -4)$ and $(0, -1)$.

10. Vertices of Δ are $(3, 4)$, $(-1, -4)$ and $(9, -4)$ and its area is 40 sq. units.

11. (*i*) $k \neq 3$ (*ii*) $k = 3$ (*iii*) No value of k.

12. $am \neq bl$

13. (*i*) $x = 14, y = 9$ (*ii*) $x = 6, y = 36$ (*iii*) $x = 2, y = 2$

15. The coordinates of trapezium are $(1, 0)$, $(0, 2)$, $(3, 0)$, $(0, 6)$ and its area is 8 sq. units.

16. 20, 30.

17. 23, 9

18. $\frac{3}{10}$

19. 15 m, 12 m

20. 40 years, 15 years

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