KIRAN TUTORIALS   Seat No.

Std 10 (English)   **Mathematics Part - I**

Time 1HRS	**Chapter 1SOLUTION**	**Marks 20**

Q.1   **Multiple Choice Questions**   **2**

1   How many solutions are there for linear equation in two variables?
a. One   b. Two   c. Three   d. Infinite solutions

Ans Option d.

2   The point which satisfies the following simultaneous equations is?
$5m - 3n = 8$; $3m + n = 2$
a. (1, 2)   b. (2, 1)   c. (- 1, 1)   d. (1, - 1)

Ans Option d.

Q.2   **Attempt the following (Activity)**   **2**

1   Complete the table to solve the following simultaneous equations.
$x - y = 4$

x	_____	- 1	0
y	0	_____	- 4
(x, y)	_____	_____	_____

Ans 1) 4   2) - 5   3) (4, 0)   4) (- 1, -5)   5) (0, - 4)

Q.3   **Solve the following**   **9**

1   Solve the following simultaneous equations.
$49x - 57y = 172$; $57x - 49y = 252$

Ans $49x - 57y = 172$ ...I
          $57x - 49y = 252$ ...II
          Adding equation I and equation II

$$49x - 57y = 172$$
$$+ 57x - 49y = 252$$
$$\overline{106x - 106y = 424}$$

∴ $106(x - y) = 424$
∴ $x + y = \frac{424}{106}$
∴ $x - y = 4$ ...III
          Subtracting equation I from equation II

$$57x - 49y = 252$$
$$+49x - 57y = 172$$
$$\underline{-\quad+\quad-}$$
$$8x + 8y = 80$$

          Divided by 8.
∴ $x + y = 10$ ...iv
          Adding equation III and IV

$$x - y = 4$$
$$+ x + y = 10$$
$$\overline{2x \quad = 14}$$

∴ $x = \frac{14}{2}$
∴   **x = 7**

Substituting x = 7 in equation IV

x + y = 10

∴   7 + y = 10

∴   y = 10 - 7

∴   **y = 3**

x = 7, y = 3 is the solution of given simultaneous equations.

2   In factory the ratio of salary of skilled and unskilled workers is 5 : 3. Total salary of one day of both of them is Rs. 720. Find daily wages of skilled and unskilled workers.

Ans   Let the per day salary of skilled workers be Rs. x and per day salary of unskilled workers be Rs. y.

According to the first condition

$\frac{x}{y} = \frac{5}{3}$

∴3x = 5y

∴3x - 5y = 0   ... I

According to the second condition

x + y = 720   ... II

Multiplying equation II by 5 we get

5x + 5y = 3600   ... III

Adding equation I and equation III we get

$$3x - 5y = 0$$
$$\underline{5x + 5y = 3600}$$
$$8x = 3600$$

∴x = $\frac{3600}{8}$

∴**x = 450**

Substituting x = 450 in equation II we get,

x + y = 720

∴450 + y = 720

∴y = 720 - 450

∴**y = 270**

∴Daily salary of skilled worker's is Rs. 450 and that of unskilled worker's is Rs. 270.

3   Sum of the present ages of Manisha and Savita is 31. Manisha's age 3 years ago was 4 times the age of Savita. Find their present ages.

Ans Let the present age of Manisha be x years and age of Savita be y years.

According to first condition

x + y = 31   ... I

3 years ago,

Manisha's age = (x - 3) years and Savita's age = (y - 3) years

∴ x - 3 = 4 (y - 3)

∴ x - 3 = 4y - 12

∴ x - 4y = - 12 + 3

∴ x - 4y = - 9   ... II

Subtracting equation II from equation I we get,

x + y = 31

x - 4y = - 9

<u>-   +   +</u>

   5y = 40

∴ y = $\frac{40}{5}$

∴ **y = 8**

Substituting y = 8 in equation I we get,

x + y = 31

∴   x + 8 = 31

∴   x = 31 - 8

∴   **x = 23**

The present age of Manisha is 23 years and the present age of Savita is 8 years.

Q.4   **Answer the following**   **4**

1
| A boat travels 16 km upstream and 24 km downstream in 6 hours. | The same boat travels 36 km upstream and 48 km downstream in 13 hours |

| Find the speed of water current and speed of boat in still water |

Ans Let the speed of the boat in still water be x km/hr and the speed
of water current by y km/hr

∴   Speed of boat in downstream = (x + y) km/hr.

and that in upstream = (x - y) km/hr.

Now distance = speed × time   ∴   time = $\frac{distance}{speed}$

Time taken by the boat to travel 16 km upstream = $\frac{16}{x-y}$ hours and it takes

$\frac{24}{x+y}$ hours to travel 24 km downstream.

from first condition -

$\frac{16}{x-y} + \frac{24}{x+y} = 6$ ... I

from 2nd condition

$\frac{36}{x-y} + \frac{48}{x+y} = 13$ ... II

By replacing $\frac{1}{x-y}$ by m and $\frac{1}{x+y}$ by n we get

16m + 24n = 6   ... III

36m + 48n = 13   ... IV

Solving equations (III) and (IV) m = $\frac{1}{4}$, n = $\frac{1}{12}$

Replacing m, n by their original values we get

x - y = 4   ... V

x + y = 12   ... VI

Solving equations (V), (VI) we get x = 8, y = 4

∴   speed of the boat in still water is 8 km/hr. and speed of water current is 4 km/hr.

Q.5   **Answer the following**   **3**

1   The perimeter of a rectangle is 40 cm. The length of the rectangle is more than double its breadth by 2.
Find length and breadth.

Ans Let length of rectangle be x cm and breadth be y cm.

From first condition -

2(x + y) = 40

x + y = 20   ... I

From 2nd condition -

x = 2y + 2

∴   x - 2y = 2   ... II

Let's solve eq. (I), (II) be determinant method

x + y = 20

x - 2y = 2

$$D = \begin{vmatrix} 1 & 1 \\ 1 & -2 \end{vmatrix} = [1 \times (-2)] - (1 \times 1) = -2 - 1 = -3$$

$$Dx = \begin{vmatrix} 20 & 1 \\ 2 & -2 \end{vmatrix} = [20 \times (-2)] - (1 \times 2) = -40 - 2 = -42$$

$$Dy = \begin{vmatrix} 1 & 20 \\ 1 & 2 \end{vmatrix} = (1 \times 2) - (20 \times 1) = 2 - 20 = -18$$

$\qquad x = \frac{D_x}{D}$ and $y = \frac{D_y}{D}$

$\therefore \quad x = \frac{-42}{-3}$ and $y = \frac{-18}{-3}$

$\therefore \quad x = 14, y = 6$

$\therefore \quad$ Length of the rectangle is 14 cm and breadth is 6 cm.

YOUR FLIGHT , OUR WINGS .