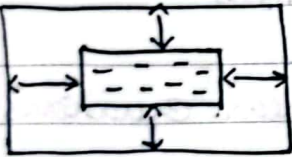


X Homework-6 (word problems)

- 1) Had Ajita scored 10 more marks in her mathematics test out of 30 marks, 9 times these marks would have been the square of her actual marks. How many marks did she get? ¹⁵
- 2) A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed? ^{42 km/hr}
- 3) Find a natural number whose square diminished by 84 is equal to thrice of 8 more than the given number. ¹²
- 4) A natural number, when increased by 12, equals 160 times its reciprocal. Find the number. ⁸
- 5) If Zeba were younger by 5 years than what she really is, then the square of her age (in years) would have been 11 more than five times her actual age. What is her age now? ^{14 yrs}
- 6) At present Asha's age is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times the present age of Nisha. Find the present ages of Asha and Nisha. ^{5 yrs, 27 yrs}
- 7)  In the centre of a rectangular lawn of dimensions 50m x 40m, a rectangular pond has to be constructed so that the area of the grass surrounding the pond would be 1184 m². Find the length and breadth of the pond. ^{34 m, 24 m}
- 8) At t minutes past 2 pm, the time needed by the minutes hand of a clock to show 3 pm was found to be 3 minutes less than $\frac{t^2}{4}$ minutes. Find t . ^{14 min}
- 9) Determine algebraically, the vertices of a \triangle formed by the lines $5x - y = 5$; $x + 2y = 1$ and $6x + y = 17$. ^{(1,0), (3,-1), (2,5)}
- 10) Jamila sold a table and a chair for Rs 1050, thereby making a profit of 10% on the table and 25% on the chair. If she had taken a profit of 25% on the table and 10% on chair, she would have got Rs 1065. Find the cost price of each. ^{Rs 500, Rs 400}

1) The father's age is six times his son's age. Four years hence, the age of the father will be four times his son's age. The present ages, in years, of the son and the father are respectively

(a) 4 and 24 (b) 5 and 30 (c) 6 and 36 (d) 3 and 24

2) Aruna has only Re 1 and Rs 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is Rs 75, then the number of Re 1 and Rs 2 coins are respectively

(a) 35 and 15 (b) 35 and 20 (c) 15 and 35 (d) 25 and 25

3) If $x = a, y = b$ is the solution of the equations $x - y = 2$ and $x + y = 4$, then the values of a and b are respectively

(a) 3 and 5 (b) 5 and 3 (c) 3 and 1 (d) -1 and -3

4) The pair of equations $5x - 15y = 8; 3x - 9y = \frac{24}{5}$ has

(a) one solution (b) two solutions (c) infinite solutions (d) no solution

5) The sum of the digits of a two-digit number is 9. If 27 is added to it, the digits of the number get reversed. The number is — (a) 25 (b) 72 (c) 63 (d) 36

6) The pair of equations $x = a, y = b$ graphically represent lines which are (a) parallel (b) intersecting at (b, a) (c) coincident (d) intersecting at (a, b)

7) One equation of a pair of dependent linear equations is $-5x + 7y = 2$. The second equation can be

(a) $10x + 14y + 4 = 0$ (b) $-10x - 14y + 4 = 0$ (c) $-10x + 14y + 4 = 0$

(d) $10x - 14y = -4$

8) $(x^2 + 1)^2 - x^2 = 0$ has (a) 4 real roots (b) 2 real roots

(c) no real roots (d) one real root

9) Which of the following has no real roots?

(a) $x^2 - 4x + 3\sqrt{2} = 0$ (b) $x^2 + 4x - 3\sqrt{2} = 0$

(c) $x^2 - 4x - 3\sqrt{2} = 0$ (d) $3x^2 + 4\sqrt{3}x + 4 = 0$

10) The area of the Δ formed by the line $\frac{x}{a} + \frac{y}{b} = 1$ with the coordinate axes is

(a) ab (b) $2ab$ (c) $\frac{ab}{2}$ (d) $\frac{ab}{4}$

X Homework - 6 (Answers)

1) Let the marks scored by Ajita be x

$$\text{ATQ, } 9(x+10) = x^2$$

$$\Rightarrow 9x + 90 = x^2$$

$$\Rightarrow x^2 - 9x - 90 = 0$$

$$\Rightarrow (x-15)(x+6) = 0$$

$$\therefore x = 15, -6$$

x cannot be -ve, \therefore required value of x is 15.

Hence, she got 15 marks.

2) Let the original average speed be x km/hr.

$$\text{ATQ, } \frac{63}{x} + \frac{72}{x+6} = 3$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$\Rightarrow 3 \left[\frac{7}{x} + \frac{8}{x+6} \right] = 3$$

$$\Rightarrow 3 \frac{(7x+42+8x)}{x(x+6)} = 1$$

$$\Rightarrow 3 \frac{(15x+42)}{x(x+6)} = 1$$

$$\Rightarrow 45x + 126 = x^2 + 6x$$

$$\Rightarrow x^2 - 39x - 126 = 0$$

$$\Rightarrow (x-42)(x+3) = 0$$

$$\therefore x = 42, -3$$

x cannot be -ve, \therefore required value of $x = 42$.

Hence, the original average speed = 42 km/hr.

3) Let the number be x .

$$x^2 - 84 = 3(x+8)$$

$$\Rightarrow x^2 - 84 = 3x + 24$$

$$\Rightarrow x^2 - 3x - 108 = 0$$

$$\Rightarrow (x+9)(x-12) = 0$$

$$x = -9, 12$$

x cannot be -ve, \therefore required value of $x = 12$

Hence, the required number is 12

$$\begin{array}{r} 3 \overline{) 90} \\ \underline{30} \\ 50 \\ \underline{30} \\ 20 \end{array}$$

$$\begin{array}{r} S \quad P \\ -9 \quad -90 \\ \quad \quad \wedge \\ \quad \quad -15, 6 \end{array}$$

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$$\begin{array}{r} S \quad P \\ -39 \quad -126 \\ \quad \quad \wedge \\ \quad \quad -42, 3 \end{array}$$

$$\begin{array}{r} 3 \overline{) 108} \\ \underline{36} \\ 12 \end{array}$$

$$\begin{array}{r} S \quad P \\ +3 \quad -108 \\ \quad \quad \wedge \\ \quad \quad +9, -12 \end{array}$$

4) Let the number be x .

$$\text{ATQ, } x+12 = \frac{160}{x}$$

$$\Rightarrow x^2 + 12x = 160$$

$$\Rightarrow x^2 + 12x - 160 = 0$$

$$\Rightarrow (x-8)(x+20) = 0$$

$$\therefore x = 8, -20$$

x cannot be $-ve$, \therefore required value of x is 8

Hence, the required ~~value~~ number is 8

5) Let Zeba's present age be x years.

$$\text{ATQ, } (x-5)^2 = 5x+11$$

$$\Rightarrow x^2 - 10x + 25 = 5x + 11$$

$$\Rightarrow x^2 - 15x + 14 = 0$$

$$\Rightarrow (x-1)(x-14) = 0$$

$$x = 1, 14$$

x cannot be 1, \therefore required value of x is 14

Hence, Zeba's present age is 14 years.

6)

	Asha	Nisha	
Present age,	$x^2 + 2$	x	} $x^2 + 2 - x$
After $(x^2 + 2 - x)$ yrs,	$x^2 + 2 + (x^2 + 2 - x)$ $= 2x^2 - x + 4$	$x^2 + 2$	

$$\text{ATQ, } 2x^2 - x + 4 = 10x - 1$$

$$\Rightarrow 2x^2 - 11x + 5 = 0$$

$$\Rightarrow 2x^2 - 10x - 1x + 5 = 0$$

$$\Rightarrow 2x(x-5) - (x-5) = 0$$

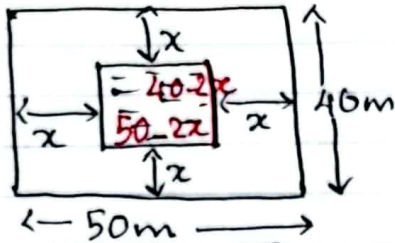
$$\Rightarrow (2x-1)(x-5) = 0$$

$$\therefore x = \frac{1}{2}, 5$$

x cannot be $\frac{1}{2}$, \therefore required value of x is 5

Hence, present ages of Asha = $x^2 + 2 = 27$ yrs
Nisha = $x = 5$ yrs.

7)



Let the width of the grass land be x m.

ATQ, $50 \times 40 - (50 - 2x)(40 - 2x) = 1184$
 $50 \times 40 - (50 \times 40 - 100x - 80x + 4x^2) = 1184$
 $2000 - 2000 + 180x - 4x^2 = 1184$

$4x^2 - 180x + 1184 = 0$
 $(\div 4) \Rightarrow x^2 - 45x + 296 = 0$
 $\Rightarrow (x - 37)(x - 8) = 0$
 $\therefore x = 37, 8$

S	P
-45	296
	^
-37	-8

x cannot be 37, \therefore required value of $x = 8$
Hence length of the pond = $50 - 2x = 50 - 16 = 34$ m
breadth of the pond = $40 - 2x = 40 - 16 = 24$ m

8)

$60 - t = \frac{t^2}{4} - 3$
 $4(60 - t) = t^2 - 12$
 $240 - 4t = t^2 - 12$
 $t^2 + 4t - 252 = 0$
 $(t - 14)(t + 18) = 0$
 $t = 14, -18$

S	P
4	-252
	^
-14	18

t cannot be -ve, \therefore required value of $t = 14$
Hence, $t = 14$ minutes

9)

$5x - y = 5 \rightarrow (1)$
 $x + 2y = 1 \rightarrow (2)$
 $6x + y = 17 \rightarrow (3)$

From (1) and (2),
 $(1) \times 2 \Rightarrow 10x - 2y = 10$
 $(2) \Rightarrow x + 2y = 1$

 $(+), 11x = 11$
 $x = 1$
 $y = 0$

From (2) and (3), $(2) \Rightarrow x + 2y = 1$
 $(3) \times 2 \Rightarrow 12x + 2y = 34$

 $(-)$ $-11x = -33$
 $x = 3$

$y = -1$
 $x = 3$

From (1) and (3),
 $(1) + (3), 11x = 22$
 $x = 2$
 $y = 5$

Hence, the vertices of Δ formed are $(1, 0)$, $(3, -1)$ and $(2, 5)$

$$10) \quad S.P = C.P + P\% \text{ of } C.P$$

Let x be the cost price of table and $2y$ be the cost price of chair

$$\text{ATQ, } x + 10\% \text{ of } x + y + 25\% \text{ of } y = 1050$$

$$x + \frac{10}{100}x + y + \frac{25}{100}y = 1050$$

$$110x + 125y = 105000 \rightarrow (1)$$

$$\text{Also, } x + 25\% \text{ of } x + y + 10\% \text{ of } y = 1065$$

$$x + \frac{25}{100}x + y + \frac{10}{100}y = 1065$$

$$125x + 110y = 106500 \rightarrow (2)$$

$$(1) + (2), \quad 235x + 235y = 211500$$
$$\div 235 \Rightarrow x + y = 900 \rightarrow (3)$$

$$(1) - (2), \quad -15x + 15y = -1500$$
$$\div -15 \Rightarrow x - y = 100 \rightarrow (4)$$

$$(3) + (4), \quad 2x = 1000$$

$$x = 500$$

$$y = 400$$

Hence, the C.P of table = Rs 500

C.P of Chair = Rs 400