## Chapter – 02

## Linear Equations in One Variable

### Exercises 2.4

**Question 1.** Amina thinks of a number and subtracts 5/2 from it. She multiplies the result by 8. The result now obtained is 3 times the same number she thought of. What is the number?

**Answer:**

Let the number Amina thinks of be x.

According to question. She subtracts 5/2 from it, then she multiplies the result by 8 and the result equals 3 times the original number

$\left(x - \frac{5}{2}\right) \times 8 = 2\,x$

Multiplying inside the bracket, we get,8x - 5/2 × 8 = 3x8x - 5 × 4 = 3x

⇒ 8x - 20 = 3x

⇒ 8x - 3x = 20

⇒ 5x = 20

⇒ x = 4

Thus, the number is 4.

**Question 2**. A positive number is 5 times another number. If 21 is added to both the numbers, then one of the new numbers becomes twice the other new number. What are the numbers?

**Answer:**

Let the numbers be x and 5x (as one number is 5 times the other number)

Given, if 21 is added to both the numbers, numbers become (x + 21) and (5 x + 21), then one of the new numbers becomes twice the other new number

Then,

21 + 5x = 2(x + 21)21 + 5x = 2x + 425x - 2x = 42 - 213x = 21x = 7

Also,

5 x = 5(7) = 35

Thus, one number is 7 and the other number is 35.

**Question 3.** Sum of the digits of a two-digit number is 9. When we interchange the digits, it is found that the resulting new number is greater than the original number by 27. What is the two-digit number?

**Answer:** Let the two-digit number be = 10 x + y

Given: Sum of digits of two-digit number = 9, x + y = 9So, if one of the digit is x, second digit will be 9 – x So we have our 2-digit number = 10 x + (9 - x) Reversing the digits of this number = 10 (9 - x) + x Now it is given that resulting new number is greater than the original number by 27. Therefore, 10(9 - x) + x - (10 x + 9 - x) = 2790 - 10 x + x - 10 x - 9 + x = 2781 - 18 x = 2718 x = 81 - 2718 x = 54x = 54/18x = 3So the number is 10 x 3 + (9 - 3) = 36

**Question 4.** One of the two digits of a two-digit number is three times the other digit. If you interchange the digits of this two-digit number and add the resulting number to the original number, you get 88. What is the original number?

**Answer:** Let the digit at ten's place and one's place be x and 3x.

Then original number =10(x) + 1(3x) = 13x

On interchanging the digits, the digits at one's place and tens place will be x and 3x

The number formed after interchanging = 10(3x) + x = 31x

Now, New Number + Original Number = 88

13x + 31x = 88

44x = 88

$x = \frac{88}{44}$

We get, x = 2

Thus, the two-digit number is 13x = 13(2) = 26 or 62.

**Question 5.** Shobo's mother's present age is six times Shobo's present age. Shobo's age five years from now will be one third of his mother's present age. What are their present ages?

**Answer:**

Let Shobo's present age is x years.

Thus, his mother's present age will be 6x years.

After 5 Years: Shobo's Age = x + 5 years Given, Shobo's age five years from now will be one third of his mother's present age

⇒ 3(x + 5) = 6x

⇒ 3x + 15 = 6x

⇒ 15 = 6x − 3x

⇒ 3x = 15

$\Rightarrow x = 5$

Hence, Age of Shabo = x= 5 years

Age of his mother = 6x = 6(5) = 30 years

**Question 6**. There is a narrow rectangular plot, reserved for a school, in Mahuli village. The length and breadth of the plot are in the ratio 11:4. At the rate Rs 100 per metre it will cost the village panchayat Rs 75000 to fence the plot. What are the dimensions of the plot?

**Answer:**

Since, the ratio given is 11: 4

Let the length and breadth of the plot be l = 11x and b = 4x respectively.

Since the plot is of rectangular shape and we know the perimeter of a rectangle is 2(l + b)

Also, rate of fencing the plot is Rs 100 for 1m

Now,

Perimeter of Rectangular plot = 2(l + b) = 2(11x + 4x)

Perimeter of rectangular plot = 2(15 x) = 30x

Cost of fencing one meter = Rs. 100

Therefore, cost of fencing 30x m = 30 x × 100 = 75000

3000x = 75000

$x = \frac{75000}{3000}$

x = 25

Thus, the length = 11 x (25) = 275 m

And the breadth = 4 x (25) = 100 m

**Question 7.** Hasan buys two kinds of cloth materials for school uniforms, shirt material that costs him Rs 50 per metre and trouser material that costs him Rs 90 per metre. For every 2 meters of the trouser material, he buys 3 metres of the shirt material. He sells the materials at 12% and 10% profit respectively. His total sale is Rs 36,600. How much trouser material did he buy?

**Answer:** Cost of 1 m shirt material = Rs. 50

Cost of 1 m trouser material = Rs. 90Now after 12% Profit, Selling Price of 1 m shirt material = 50 + 12% of 50 + $\left(\frac{12}{100} \times 50\right)$

= 50 + 6 = Rs. 56And after 10% Profit, Selling Price of 1 m shirt material = 90 + 10% of 90 = $90 + \left(\frac{10}{100} \times 90\right)$

= 90 + 9 = Rs. 99It is given that if he buys 2 m of shirt material then he buys 3 m of shirt material. Let that he buys 2x m of shirt material then he will buy 3x m of trouser material. Total Selling Price = 56 x 3x + 99 x 2x = 168x + 198x = Rs. 366x It is given that the total selling price = 36600Therefore,366 x = 36600x = 100So the trouser material he buys = 2x = 2 x 100 = 200 m Therefore, the trouser material is 200 m.

**Question 8.** Half of a herd of deer are grazing in the field and three fourths of the remaining are playing nearby. The rest 9 are drinking water from the pond. Find the number of deer in the herd.

**Answer:**

Let the number of deer be x

The no. of deer grazing in the field= half of x = x/2

No. of deer remaining = x - x/2The no. of Deer playing in the field = three-fourth of remaining deer =

The no. of Deer drinking water = 9∵ Total Deer= (Grazing Deer) + (Playing Deer) + (Deer drinking water) ∴ $x = \frac{x}{2} + \frac{3x}{8} + 9$

$x - \frac{x}{2} - \frac{3x}{8} = 9$

$\frac{8x-4x-3x}{8} = 9$

$x = 72$

∴ the number of deer is 72.

**Question 9.** A grandfather is ten times older than his granddaughter. He is also 54 years older than her. Find their present ages.

**Answer:**

Let granddaughter's age is x years.

∴ grandfather's age will be 10x years

Now, 10x = x + 54

9x =54

x = 6

Granddaughter's age is 6 years and the grandfather's age is 60

**Question 10.** Aman's age is three times his son's age. Ten years ago he was five times his son's age. Find their present ages.

**Answer:**

Let the son's present age is x years.

Then, Aman's present age is 3 x years.10 years before, Aman's age = 3 x - 10Son's age = x - 10

3 x – 10 = 5 (x - 10) [ Age 10 years before]

$3x - 5x = -50 + 10$

$-2x = -40$

$x = 20$

thus, son’s age is 20 years and Aman’s age is 60.