

CBSE Class –VIII Mathematics

NCERT Solutions

CHAPTER - 2

Linear Equations in One Variable (Ex. 2.4)

1. Amina thinks of a number and subtracts $\frac{5}{2}$ 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?

Ans. Let Amina thinks of a number x .

According to the question, $8\left(x - \frac{5}{2}\right) = 3x$

$$\Rightarrow 8x - \frac{8 \times 5}{2} = 3x$$

$$\Rightarrow 8x - 4 \times 5 = 3x$$

$$\Rightarrow 8x - 20 = 3x$$

$$\Rightarrow 8x - 3x = 20$$

$$\Rightarrow 5x = 20$$

$$\Rightarrow x = \frac{20}{5} = 4$$

Hence, the number is 4.

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?

Ans. Let another number be x .

Then positive number = $5x$

According to the question,

$$5x + 21 = 2(x + 21)$$

$$\Rightarrow 5x + 21 = 2x + 42$$

$$\Rightarrow 5x - 2x = 42 - 21$$

$$\Rightarrow 3x = 21$$

$$\Rightarrow x = \frac{21}{3} = 7$$

Hence, another number = 7

and positive number = $7 \times 5 = 35$

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?

Ans. Let the unit place digit of a two-digit number be x .

Therefore, the tens place digit = $9 - x$

\therefore 2-digit number = 10 x tens place digit + unit place digit

\therefore Original number = $10(9 - x) + x$

According to the question, New number

= Original number + 27

$$\Rightarrow 10x + (9 - x) = 10(9 - x) + x + 27$$

$$\Rightarrow 10x + 9 - x = 90 - 10x + x + 27$$

$$\Rightarrow 9x + 9 = 117 - 9x$$

$$\Rightarrow 9x + 9x = 117 - 9$$

$$\Rightarrow 18x = 108$$

$$\Rightarrow x = \frac{108}{18} = 6$$

Hence, the 2-digit number = $10(9 - x) + x$

= $10(9 - 6) + 6$

$$= 10 \times 3 + 6$$

$$= 30 + 6 = 36$$

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?

Ans. Let the unit place digit of a two-digit number be x .

Therefore, the tens place digit = $3x$

\therefore 2-digit number = $10 \times \text{tens place digit} + \text{unit place digit}$

$$\therefore \text{Original number} = 10 \times 3x + x = 30x + x = 31x$$

According to the question, New number + Original number = 88

$$\Rightarrow 10x + 3x + 31x = 88$$

$$\Rightarrow 44x = 88$$

$$\Rightarrow x = \frac{88}{44} = 2$$

Hence, the 2-digit number = $31x = 31 \times 2 = 62$

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?

Ans. Let Shobo's present age be x years.

And Shobo's mother's present age = $6x$ years

According to the question, $x + 5 = \frac{1}{3} \times 6x$

$$\Rightarrow x + 5 = 2x$$

$$\Rightarrow 2x = x + 5$$

$$\Rightarrow 2x - x = 5$$

$$\Rightarrow x = 5 \text{ years.}$$

Hence, Shobo's present age = 5 years

And Shobo's mother's present age = $6 \times 5 = 30$ years.

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 meter it will cost the village panchayat Rs. 75,000 to fence the plot. What are the dimensions of the plot?

Ans. Let the length and breadth of the rectangular plot be $11x$ and $4x$ respectively.

$$\therefore \text{Perimeter of the plot} = \frac{\text{Total Cost}}{\text{Cost of 1 meter}} = \frac{75000}{100} = 750 \text{ m}$$

We know that Perimeter of rectangle = 2 (length + breadth)

Therefore, according to the question,

$$750 = 2(11x + 4x)$$

$$\Rightarrow 750 = 2 \times 15x$$

$$\Rightarrow 750 = 30x$$

$$\Rightarrow 30x = 750$$

$$\Rightarrow x = \frac{750}{30} = 25$$

Hence, length of rectangular plot = $11 \times 25 = 275$ m

And breadth of rectangular plot = $4 \times 25 = 100$ m

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 metres of the trouser material he buys 3 metres of shirt material. He sells the materials at 12 % and 10 % profit respectively. His total sale is Rs. 36,660. How much trouser material did he buy ?

Ans. Let ratio between shirt material and trouser material be $3x: 2x$.

The cost of shirt material = $50 \times 3x = 150x$

The selling price at 12% gain = $\frac{100 + P\%}{100} \times \text{C.P.}$

$$\begin{aligned} &= \frac{100+12}{100} \times 150x \\ &= \frac{112}{100} \times 150x = 168x \end{aligned}$$

The cost of trouser material = $90 \times 2x = 180x$

The selling price at 10% gain = $\frac{100 + P\%}{100} \times \text{C.P.}$

$$\begin{aligned} &= \frac{100+10}{100} \times 180x \\ &= \frac{110}{100} \times 180x = 198x \end{aligned}$$

According to the question,

$$168x + 198x = 36,600$$

$$\Rightarrow 366x = 36600$$

$$\Rightarrow x = \frac{36600}{366} = 100 \text{ meters}$$

Now, trouser material = $2x = 2 \times 100$

= 200 metres

Hence, Hasan bought 200 metres of the trouser material.

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.

Ans. Let the total number of deer in the herd be x .

According to question, $x = \frac{x}{2} + \frac{3}{4} \times \left(x - \frac{x}{2}\right) + 9$

$$\Rightarrow x = \frac{x}{2} + \frac{3}{4} \left(\frac{2x - x}{2}\right) + 9$$

$$\Rightarrow x = \frac{x}{2} + \frac{3}{4} \times \frac{x}{2} + 9$$

$$\Rightarrow x = \frac{x}{2} + \frac{3}{8}x + 9$$

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

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

$$\Rightarrow \frac{x}{8} = 9$$

$$\Rightarrow x = 9 \times 8 = 72$$

Hence, the total number of deer in the herd is 72.

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

Ans. Let present age of granddaughter be x years.

Therefore, Grandfather's age = $10x$ years

According to question, $10x = x + 54$

$$\Rightarrow 10x - x = 54$$

$$\Rightarrow 9x = 54$$

$$\Rightarrow x = \frac{54}{9} = 6 \text{ years}$$

Hence, granddaughter's age = 6 years and grandfather's age = $10 \times 6 = 60$ years.

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.

Ans. Let the present age of Aman's son be x years.

Therefore, Aman's age = $3x$ years

According to question,

$$3x - 10 = 5(x - 10)$$

$$\Rightarrow 3x - 10 = 5x - 50$$

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

$$\Rightarrow -2x = -40$$

$$\Rightarrow x = \frac{-40}{-2} = 20 \text{ years}$$

Hence, Aman's son's present age = 20 years

And Aman's present age = $3 \times 20 = 60$ years