



NCERT SOLUTIONS FOR CLASS 8 MATHS LINEAR
EQUATION IN ONE VARIABLE EX-2.4

Q1. 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 think 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.

Q2. 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
= $7 \times 5 = 35$

Q3. 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 = $10 \times \text{tens place digit} + \text{unit}$

place digit

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

According to the question, New number

$$= \text{Original number} + 27$$

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

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

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

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

$$\Rightarrow 18x = 108$$

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

$$\text{Hence, the 2-digit number} = 10(9 - x) + x = 10(9 - 6) + 6 = 10 \times 3 + 6 = 30 + 6 = 36$$

Q4. 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 x tens place digit + unit place digit

place digit

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

According to the question, New number

$$= \text{Original number} + 27$$

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

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

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

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

$$\Rightarrow 18x = 108$$

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

$$\text{Hence, the 2-digit number} = 10(9 - x) + x = 10(9 - 6) + 6 = 10 \times 3 + 6 = 30 + 6 = 36$$

Q4. 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 x tens place digit + unit place digit

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

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

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

$$\Rightarrow 44x = 88$$

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

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

Q5. 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 age?

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.

Q6. 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

Q7. Hasan buys two kinds of cloth materials for school uniforms, shirt material that costs him Rs.50 per meter and trouser material that costs him Rs.90 per meter.

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 = $\frac{100 + P\%}{100} \times \text{C.P.}$

$$= \frac{100+12}{100} \times 150x$$

$$= \frac{112}{100} \times 150x = 168x$$

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

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

$$= \frac{100+10}{100} \times 180x$$

$$= \frac{110}{100} \times 180x = 198x$$

According to the question,

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

$$\Rightarrow 366x = 36600$$

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

$$\text{Now, trouser material} = 2x = 2 \times 100$$

$$= 200 \text{ meters}$$

Hence, Hasan bought 200 meters of the trouser material.

For every 2 meters of the trouser material he buys 3 meters of the shirt material. He sells the materials at 12% and 10% respectively. His total sale is Rs.36,000. How much trouser material did he buy?

Q8. 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.

Q9. 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.

Q10. 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 age = 20 years

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

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