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 = 7×5 = 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 = $9-x$

$\because$ 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

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

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

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

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

$\Rightarrow 18x=108$

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

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 = $3x$

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

place digit

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

According to the question, New number

= Original number + 27

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

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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 = $3x$

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

$\therefore$ 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 = $31x=31\times 2=62$

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, $x+5=\frac{1}{3}\times 6x$

$\Rightarrow x+5=2x$

$\Rightarrow 2x=x+5$

$\Rightarrow 2x-x=5$

$\Rightarrow x=5$ years.

Hence, Shobo's present age = 5 years

And Shobo's mother's present age = 6×5 = 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 panchayatRs.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.

$\therefore$ Perimeter of the plot = $\frac{\text{Total Cost}}{\text{Cost of 1 meter}}$ = $\frac{75000}{100}$ = 750 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 = 11×25 = 275 m

And breadth of rectangular plot = 4×25 = 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 = $\frac{100 + \text{P}\%}{100} \times$ C.P.

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

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

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

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

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

= 200 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, $x=\frac{x}{2}+\frac{3}{4}\times\left(x-\frac{x}{2}\right)+9$

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

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

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

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

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

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

$\Rightarrow x=9\times8=72$

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, $10x=x+54$

$\Rightarrow 10x-x=54$

$\Rightarrow 9x=54$

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

Hence, granddaughter's age = 6 years and grandfather's age = 10×6 = 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 Amon'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 years

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

And Aman's age = 3×2 = 60 years

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