NCERT SOLUTIONS FOR CLASS 8 MATHS LINEAR EQUATION IN ONE VARIABLE EX-2.2

Q1. If you subtract $\frac{1}{2}$ from a number and multiply the result by $\frac{1}{2}$, you get $\frac{1}{8}$. What is the number?

Ans: Let the number be x.

According to the question,

$$\frac{1}{2}\left(x-\frac{1}{2}\right)=\frac{1}{8}$$

$$\Rightarrow 2\times\frac{1}{2}\left(x-\frac{1}{2}\right)=\frac{1}{8}\times 2$$

[Multiplying both sides by 2]

$$\Rightarrow x-\frac{1}{2}=\frac{1}{4}$$

$$\Rightarrow x-\frac{1}{2}+\frac{1}{2}=\frac{1}{4}+\frac{1}{2}$$

[Adding both sides $\frac{1}{2}$]

$$\Rightarrow x=\frac{1+2}{4}$$

$$\Rightarrow x=\frac{3}{4}$$

Hence, the required number is $\frac{3}{4}$.

Q2. The perimeter of a rectangular swimming pool is 154 m. Its length is 2 m more than twice its breadth. What are the length and breadth?

Ans: Let the breadth of the pool be x m.

Then, the length of the pool = $(2x+2)$ m

Perimeter = $2(l+b)$

$\Rightarrow 154 = 2(2x+2+x)$

$\Rightarrow \frac{154}{2} = \frac{2(2x+2+x)}{2}$

[Dividing both sides by 2]

$\Rightarrow 77 = 3x+2$

$\Rightarrow 77-2 = 3x+2-2$

[Subtracting 2 from both sides]

$\Rightarrow 75 = 3x$

$\Rightarrow \frac{75}{3} = \frac{3x}{3}$

[Dividing both sides by 3]

$\Rightarrow 25 = x$

$\Rightarrow x = 25$ m

Hence, length of the pool = $2x + 2$

$2 \times 25 + 2 = 50 + 2 = 52$ m

And, breadth of the pool = 25 m.

Q3. The base of an isosceles triangle is $\frac{4}{3}$ cm. The perimeter of the triangle is $4\frac{2}{15}$ cm. What is the length of either of the remaining equal sides?

Ans: Let each of equal sides of an isosceles triangle be x cm.

Perimeter of a triangle = Sum of all three sides

$\Rightarrow 4\frac{2}{15} = \frac{4}{3} + x + x$

$\Rightarrow \frac{62}{15} = \frac{4}{3} + 2x$

$\Rightarrow \frac{62}{15} - \frac{4}{3} = \frac{4}{3} - \frac{4}{3} + 2x$

[Subtracting $\frac{4}{3}$ from both the sides]

$\Rightarrow \frac{62-20}{15}=2x$

$\Rightarrow \frac{42}{15}=2x$

$\Rightarrow \frac{42}{15\times 2}=\frac{2x}{2}$

[Dividing both sides by 2]

$\Rightarrow \frac{7}{5}=x$

$\Rightarrow x=1\frac{2}{5}$ cm

Hence, each equal side of an isosceles triangle is $1\frac{2}{5}$ cm.

Q4. Sum of two numbers is 95. If one exceeds the other by 15, find the numbers.

Ans: Sum of two number = 95

Let the first number be x, then another number be $x+15$.

According to the question, $x+x+15=95$

$\Rightarrow 2x+15=95$

$\Rightarrow 2x+15-15=95-15$

[Subtracting 15 from both sides]

$\Rightarrow 2x=80$

$\Rightarrow \frac{2x}{2}=\frac{80}{2}$

[Dividing both sides by 2]

$\Rightarrow x=40$

Hence, the first number = 40

And another number = 40 + 15 = 55.

Q5. Two numbers are in the ratio 5 : 3. If they differ by 18, what are the numbers?

Ans: Let the two numbers be $5x$ and $3x$.

According to question, $5x-3x=18$

$\Rightarrow 2x=18$

$\Rightarrow \frac{2x}{2}=\frac{18}{2}$

[Dividing both sides by 2]

$\Rightarrow x=9$

Hence, first number = 5×9 = 45 and second number = 3×9 = 27.

Q6. Three consecutive integers add up to 51. What are these integers?

Ans: Let the three consecutive integers be $x, x+1$ and $x+2$.

According to the question, $x+x+1+x+2=51$

$\Rightarrow 3x+3=51$

$\Rightarrow 3x+3-3=51-3$

[Subtracting 3 from both sides]

$\Rightarrow 3x=48$

$\Rightarrow \frac{3x}{3}=\frac{48}{3}$

[Dividing both sides by 3]

$\Rightarrow x = 16$

Hence, first integer = 16,

second integer = 16 + 1 = 17 and

third integer = 16 + 2 = 18.

Q7. The sum of three consecutive multiples of 8 is 888. Find the multiples.

Ans: Let the three consecutive multiples of 8 be $x, x+8$ and $x+16$.

According to question, $x + x + 8 + x + 16 = 888$

$\Rightarrow 3x + 24 = 888$

$\Rightarrow 3x + 24 - 24 = 888 - 24$

[Subtracting 24 from both sides]

$\Rightarrow 3x = 864$

$\Rightarrow \frac{3x}{3} = \frac{864}{3}$

[Dividing both sides by 3]

$\Rightarrow x = 288$

Hence, first multiple of 8 = 288,

second multiple of 8 = 288 + 8 = 296 and third multiple of 8 = 288 + 16 = 304.

Q8. Three consecutive integers are such that when they are taken in increasing order and multiplied by 2, 3 and 4 respectively, they add up to 74. Find these numbers.

Ans: Let the three consecutive integers be $x, x+1$ and $x+2$.

According to the question,

$2x+3(x+1)+4(x+2)=74$

$\Rightarrow 2x+3x+3+4x+8=74$

$\Rightarrow 9x+11=74$

$\Rightarrow 9x+11-11=74-11$

[Subtracting 11 from both sides]

$\Rightarrow 9x=63$

$\Rightarrow \frac{9x}{9}=\frac{63}{9}$

[Dividing both sides by 9]

$\Rightarrow x=7$

Hence first integer = 7, second integer
= 7 + 1 = 8 and third integer = 7 + 2 = 9.

Q9. The ages of Rahul and Haroon are in the ratio 5 : 7. Four years later the sum of their ages will be 56 years. What are their present ages?

Ans: Let the present ages of Rahul and Haroon be $5x$ years and $7x$ years respectively.

According to condition, $(5x+4)+(7x+4)=56$

$\Rightarrow 12x+8=56$

$\Rightarrow 12x+8-8=56-8$

[Subtracting 8 from both sides]

$\Rightarrow 12x=48$

$\Rightarrow \frac{12x}{12}=\frac{48}{12}$

[Dividing both sides by 12]

$\Rightarrow x=4$

Hence, present age of Rahul = 5×4 = 20 years and present age of Haroon
= 7×4 = 28 years.

Q10. The number of boys and girls in a class are in the ratio 7 : 5. The number of boys is 8 more than the number of girls. What is the total class strength?

Ans: Let the number of girls be x.

Then, the number of boys = $x+8$.

According to the question, $\frac{x+8}{x}=\frac{7}{5}$

$\Rightarrow 5(x+8)=7x$

$\Rightarrow 5x+40=7x$

$\Rightarrow 5x-7x=-40$

[Transposing $7x$ to L.H.S. and 40 to R.H.S.]

$\Rightarrow -2x=-40 \Rightarrow \frac{-2x}{-2}=\frac{-40}{-2}$

[Dividing both sides by -2]

$\Rightarrow x=20$

Hence the number of girls = 20 and number of boys = 20 + 8 = 28.

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