NCERT Solutions for Class 8 Maths Chapter 2 - Linear Equations in One Variable

Chapter 2 - Linear Equations in One Variable Exercise Ex. 2.1

Solution 1

$x-2=7$

Transposing 2 to R.H.S, we obtain

$x=7+2=9$

Solution 2

$y+3=10$

Transposing 3 to R.H.S, we obtain

$y=10-3=7$

Solution 3

$6=z+2$

Transposing 2 to L.H.S, we obtain

$6-2=z$

$z=4$

Solution 4

$\frac{3}{7}+x=\frac{17}{7}$

Transposing $\frac{3}{7}$ to R.H.S, we obtain

$x=\frac{17}{7}-\frac{3}{7}=\frac{14}{7}=2$

Solution 5

$6x=12$

Dividing both sides by 6, we obtain

$\frac{6x}{6}=\frac{12}{6}$

$x=2$

Solution 6

$\frac{t}{5}=10$

Multiplying both sides by 5, we obtain

$\frac{t}{5}\times 5=10\times 5$

$t=50$

Solution 7

$$\frac{2x}{3}=18$$

Multiplying both sides by $\frac{3}{2}$, we obtain

$$\frac{2x}{3}\times\frac{3}{2}=18\times\frac{3}{2}$$

$$x=27$$

Solution 8

$$1.6=\frac{y}{1.5}$$

Multiplying both sides by 1.5, we obtain

$$1.6\times1.5=\frac{y}{1.5}\times1.5$$

$$2.4=y$$

Solution 9

$$7x-9=16$$

Transposing 9 to R.H.S, we obtain

$$7x=16+9$$

$$7x=25$$

Dividing both sides by 7, we obtain

$$\frac{7x}{7}=\frac{25}{7}$$

$$x=\frac{25}{7}$$

Solution 10

$$14y-8=13$$

Transposing 8 to R.H.S, we obtain

$$14y=13+8$$

$$14y=21$$

Dividing both sides by 14, we obtain

$$\frac{14y}{14}=\frac{21}{14}$$

$$y=\frac{3}{2}$$

Solution 11

$17+6p=9$

Transposing 17 to R.H.S, we obtain

$6p=9-17$

$6p=-8$

Dividing both sides by 6, we obtain

$$\frac{6p}{6}=-\frac{8}{6}$$

$$p=-\frac{4}{3}$$

Solution 12

$$\frac{x}{3}+1=\frac{7}{15}$$

Transposing 1 to R.H.S, we obtain

$$\frac{x}{3}=\frac{7}{15}-1$$

$$\frac{x}{3}=\frac{7-15}{15}$$

$$\frac{x}{3}=-\frac{8}{15}$$

Multiplying both sides by 3, we obtain

$$\frac{x}{3}\times 3=-\frac{8}{15}\times 3$$

$$x=-\frac{8}{5}$$

Chapter 2 - Linear Equations in One Variable Exercise Ex. 2.2

Solution 1

Let the number be x. According to the question,

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

On multiplying both sides by 2, we obtain

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

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

On transposing $\frac{1}{2}$ to R.H.S, we obtain

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

$$=\frac{1+2}{4}=\frac{3}{4}$$

Therefore, the number is $\frac{3}{4}$

Solution 2

Let the breadth be x m. The length will be $(2x+2)$ m.

Perimeter of swimming pool $= 2(l+b) = 154$ m

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

$2(3x+2) = 154$

Dividing both sides by 2, we obtain

$$\frac{2(3x+2)}{2} = \frac{154}{2}$$

$3x+2 = 77$

On transposing 2 to R.H.S, we obtain,

$3x = 77-2$

$3x = 75$

On dividing both sides by 3, we obtain

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

$x = 25$

$2x+2 = 2\times 25+2 = 52$

Hence, the breadth and length of the pool are 25 m and 52 m respectively.

Solution 3

Let the length of equal sides be x cm.

Perimeter $= x$ cm $+ x$ cm $+$ Base $= 4\frac{2}{15}$ cm

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

On transposing $\frac{4}{3}$ to R.H.S, we obtain

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

$$2x = \frac{62-4\times 5}{15} = \frac{62-20}{15}$$

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

On dividing both sides by 2, we obtain

$$\frac{2x}{2} = \frac{42}{15}\times\frac{1}{2}$$

$$x = \frac{7}{5} = 1\frac{2}{5}$$

Therefore, the length of equal sides is $1\frac{2}{5}$ cm.

Solution 4

Let one number be x. Therefore, the other number will be $x + 15$.

According to the question,

$x + x + 15 = 95$

$2x + 15 = 95$

On transposing 15 to R.H.S, we obtain

$2x = 95 - 15$

$2x = 80$

On dividing both sides by 2, we obtain

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

$x = 40$

$x + 15 = 40 + 15 = 55$

Hence, the numbers are 40 and 55.

Solution 5

Let the common ratio between these numbers be x. Therefore, the numbers will be $5x$ and $3x$ respectively.

Difference between these numbers = 18

$5x - 3x = 18$

$2x = 18$

Dividing both sides by 2,

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

$x = 9$

First number = $5x = 5 \times 9 = 45$

Second number = $3x = 3 \times 9 = 27$

Solution 6

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

Sum of these numbers = $x + x + 1 + x + 2 = 51$

$3x + 3 = 51$

On transposing 3 to R.H.S, we obtain

$3x = 51 - 3$

$3x = 48$

On dividing both sides by 3, we obtain

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

$x = 16$

$x + 1 = 17$

$x + 2 = 18$

Hence, the consecutive integers are 16, 17, and 18.

Solution 7

Let the three consecutive multiples of 8 be $8x$, $8(x+1)$, $8(x+2)$.
Sum of these numbers $= 8x + 8(x+1) + 8(x+2) = 888$
$8(x + x + 1 + x + 2) = 888$
$8(3x + 3) = 888$
On dividing both sides by 8, we obtain

$$\frac{8(3x+3)}{8} = \frac{888}{8}$$

$3x + 3 = 111\backslash$
On transposing 3 to R.H.S, we obtain
$3x = 111 - 3$
$3x = 108$
On dividing both sides by 3, we obtain

$$\frac{3x}{3} = \frac{108}{3}$$

$x = 36$
First multiple $= 8x = 8 \times 36 = 288$
Second multiple $= 8(x+1) = 8 \times (36+1) = 8 \times 37 = 296$
Third multiple $= 8(x+2) = 8 \times (36+2) = 8 \times 38 = 304$
Hence, the required numbers are 288, 296, and 304.

Solution 8

Let three consecutive integers be x, $x+1$, $x+2$. According to the question,
$2x + 3(x+1) + 4(x+2) = 74$
$2x + 3x + 3 + 4x + 8 = 74$
$9x + 11 = 74$
On transposing 11 to R.H.S, we obtain
$9x = 74 - 11$
$9x = 63$
On dividing both sides by 9, we obtain

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

$x = 7$
$x + 1 = 7 + 1 = 8$
$x + 2 = 7 + 2 = 9$
Hence, the numbers are 7, 8, and 9.

Solution 9

Let common ratio between Rahul's age and Haroon's age be x.
Therefore, age of Rahul and Haroon will be $5x$ years and $7x$ years respectively. After 4 years, the age of Rahul and Haroon will be $(5x+4)$ years and $(7x+4)$ years respectively.
According to the given question, after 4 years, the sum of the ages of Rahul and Haroon is 56 years.
Therefore, $(5x + 4 + 7x + 4) = 56$
$12x + 8 = 56$
On transposing 8 to R.H.S, we obtain
$12x = 56 - 8$
$12x = 48$
On dividing both sides by 12, we obtain

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

$x = 4$
Rahul's age $= 5x$ years $= (5 \times 4)$ years $= 20$ years
Haroon's age $= 7x$ years $= (7 \times 4)$ years $= 28$ years

Solution 10

Let the common ratio between the number of boys and numbers of girls be x.
Number of boys $= 7x$
Number of girls $= 5x$
According to the given question,

Number of boys = Number of girls + 8
Therefore, $7x = 5x + 8$
On transposing $5x$ to L.H.S, we obtain
$7x - 5x = 8$
$2x = 8$
On dividing both sides by 2, we obtain
$$\frac{2x}{2} = \frac{8}{2}$$
$x = 4$
Number of boys $= 7x = 7 \times 4 = 28$
Number of girls $= 5x = 5 \times 4 = 20$
Hence, total class strength $= 28 + 20 = 48$ students

Solution 11

Let Baichung's father's age be x years. Therefore, Baichung's age and Baichung's grandfather's age will be $(x - 29)$ years and $(x + 26)$ years respectively.
According to the given question, the sum of the ages of these 3 people is 135 years.
Therefore, $x + x - 29 + x + 26 = 135$
$3x - 3 = 135$
On transposing 3 to R.H.S, we obtain
$3x = 135 + 3$
$3x = 138$
On dividing both sides by 3, we obtain
$$\frac{3x}{3} = \frac{138}{3}$$
$x = 46$
Baichung's father's age $= x$ years $= 46$ years
Baichung's age $= (x - 29)$ years $= (46 - 29)$ years $= 17$ years
Baichung's grandfather's age $= (x + 26)$ years $= (46 + 26)$ years $= 72$ years.

Solution 12

Let Ravi's present age be x years.
Fifteen years later, Ravi's age = 4 × His present age
$x + 15 = 4x$
On transposing x to R.H.S, we obtain
$15 = 4x - x$
$15 = 3x$
On dividing both sides by 3, we obtain

$$\frac{15}{3} = \frac{3x}{3}$$
$5 = x$
Hence, Ravi's present age = 5 years

Solution 13

Let the number be x.
According to the given question,

$$\frac{5}{2}x+\frac{2}{3}=-\frac{7}{12}$$

On transposing $\frac{2}{3}$ to R.H.S, we obtain

$$\frac{5}{2}x=-\frac{7}{12}-\frac{2}{3}$$

$$\frac{5}{2}x=\frac{-7-(2\times 4)}{12}$$

$$\frac{5}{2}x=-\frac{15}{12}$$

On multiplying both sides by $\frac{2}{5}$, we obtain

$$x=-\frac{15}{12}\times\frac{2}{5}=-\frac{1}{2}$$

Hence, the rational number is $-\frac{1}{2}$.

Solution 14

Let the common ratio between the numbers of notes of different denominations be x. Therefore, numbers of Rs 100 notes, Rs 50 notes, and Rs 10 notes will be $2x$, $3x$, and $5x$ respectively.
Amount of Rs 100 notes = Rs $(100 \times 2x)$ = Rs $200x$
Amount of Rs 50 notes = Rs $(50 \times 3x)$ = Rs $150x$
Amount of Rs 10 notes = Rs $(10 \times 5x)$ = Rs $50x$
It is given that total amount is Rs 400000.
Therefore, $200x + 150x + 50x = 400000$
$\Rightarrow 400x = 400000$
On dividing both sides by 400, we obtain
$x = 1000$
Number of Rs 100 notes = $2x = 2 \times 1000 = 2000$
Number of Rs 50 notes = $3x = 3 \times 1000 = 3000$
Number of Rs 10 notes = $5x = 5 \times 1000 = 5000$

Solution 15

Let the number of Rs 5 coins be x.
Number of Rs 2 coins = 3 × Number of Rs 5 coins = $3x$
Number of Re 1 coins = 160 − (Number of coins of Rs 5 and of Rs 2)
= $160 - (3x + x) = 160 - 4x$
Amount of Re 1 coins = Rs $[1 \times (160 - 4x)]$ = Rs $(160 - 4x)$
Amount of Rs 2 coins = Rs $(2 \times 3x)$ = Rs $6x$
Amount of Rs 5 coins = Rs $(5 \times x)$ = Rs $5x$
It is given that the total amount is Rs 300.
Therefore, $160 - 4x + 6x + 5x = 300$
$160 + 7x = 300$
On transposing 160 to R.H.S, we obtain
$7x = 300 - 160$
$7x = 140$
On dividing both sides by 7, we obtain

$$\frac{7x}{7} = \frac{140}{7}$$

$x = 20$
Number of Re 1 coins = $160 - 4x = 160 - 4 \times 20 = 160 - 80 = 80$

Number of Rs 2 coins = $3x = 3 \times 20 = 60$
Number of Rs 5 coins = $x = 20$

Solution 16

Let the number of winners be x. Therefore, the number of participants who did not win will be $63 - x$.
Amount given to the winners = Rs $(100 \times x)$ = Rs $100x$
Amount given to the participants who did not win = Rs $[25(63 - x)]$
= Rs $(1575 - 25x)$
According to the given question,
$100x + 1575 - 25x = 3000$
On transposing 1575 to R.H.S, we obtain
$75x = 3000 - 1575$
$75x = 1425$
On dividing both sides by 75, we obtain

$$\frac{75x}{75} = \frac{1425}{75}$$

$x = 19$
Hence, number of winners = 19

Chapter 2 - Linear Equations in One Variable Exercise Ex. 2.3

Solution 1

$3x = 2x + 18$
On transposing $2x$ to L.H.S, we obtain
$3x - 2x = 18$
$x = 18$
L.H.S = $3x = 3 \times 18 = 54$
R.H.S = $2x + 18 = 2 \times 18 + 18 = 36 + 18 = 54$
L.H.S. = R.H.S.
Hence, the result obtained above is correct.

Solution 2

$5t-3=3t-5$

On transposing $3t$ to L.H.S and -3 to R.H.S, we obtain

$5t-3t=-5-(-3)$

$2t=-2$

On dividing both sides by 2, we obtain

$t=-1$

L.H.S $=5t-3=5\times(-1)-3=-8$

R.H.S $=3t-5=3\times(-1)-5=-3-5=-8$

L.H.S. = R.H.S.

Hence, the result obtained above is correct.

Solution 3

$5x+9=5+3x$

On transposing $3x$ to L.H.S and 9 to R.H.S, we obtain

$5x-3x=5-9$

$2x=-4$

On dividing both sides by 2, we obtain

$x=-2$

L.H.S $=5x+9=5\times(-2)+9=-10+9=-1$

R.H.S $=5+3x=5+3\times(-2)=5-6=-1$

L.H.S. = R.H.S.

Hence, the result obtained above is correct.

Solution 4

$4z+3=6+2z$

On transposing $2z$ to L.H.S and 3 to R.H.S, we obtain

$4z-2z=6-3$

$2z=3$

Dividing both sides by 2, we obtain

$$z=\frac{3}{2}$$

$$\text{L.H.S}=4z+3=4\times\left(\frac{3}{2}\right)+3=6+3=9$$

$$\text{R.H.S}=6+2z=6+2\times\left(\frac{3}{2}\right)=6+3=9$$

L.H.S. = R.H.S.

Hence, the result obtained above is correct.

Solution 5

$2x-1=14-x$

Transposing x to L.H.S and 1 to R.H.S, we obtain

$2x+x=14+1$

$3x=15$

Dividing both sides by 3, we obtain

$x=5$

L.H.S $=2x-1=2\times(5)-1=10-1=9$

R.H.S $=14-x=14-5=9$

L.H.S. = R.H.S.

Hence, the result obtained above is correct.

Solution 6

$8x+4=3(x-1)+7$
$8x+4=3x-3+7$

Transposing $3x$ to L.H.S and 4 to R.H.S, we obtain
$8x-3x=-3+7-4$
$5x=-7+7$
$x=0$
L.H.S $=8x+4=8\times(0)+4=4$
R.H.S $=3(x-1)+7=3\,(0-1)+7=-3+7=4$
L.H.S. = R.H.S.
Hence, the result obtained above is correct.

Solution 7

$$x=\frac{4}{5}(x+10)$$

Multiplying both sides by 5, we obtain
$5x=4(x+10)$
$5x=4x+40$
Transposing $4x$ to L.H.S, we obtain
$5x-4x=40$
$x=40$
L.H.S $=x=40$

$$\text{R.H.S}=\frac{4}{5}(x+10)=\frac{4}{5}(40+10)=\frac{4}{5}\times 50=40$$

L.H.S. = R.H.S.
Hence, the result obtained above is correct.

Solution 8

$$\frac{2x}{3}+1=\frac{7x}{15}+3$$

Transposing $\frac{7x}{15}$ to L.H.S and 1 to R.H.S, we obtain

$$\frac{2x}{3}-\frac{7x}{15}=3-1$$

$$\frac{5\times 2x-7x}{15}=2$$

$$\frac{3x}{15}=2$$

$$\frac{x}{5}=2$$

Multiplying both sides by 5, we obtain
$x=10$

$$\text{L.H.S}=\frac{2x}{3}+1=\frac{2\times 10}{3}+1=\frac{2\times 10+1\times 3}{3}=\frac{23}{3}$$

$$\text{R.H.S}=\frac{7x}{15}+3=\frac{7\times 10}{15}+3=\frac{7\times 2}{3}+3=\frac{14}{3}+3=\frac{14+3\times 3}{3}=\frac{23}{3}$$

L.H.S. = R.H.S.
Hence, the result obtained above is correct.

Solution 9

$$2y+\frac{5}{3}=\frac{26}{3}-y$$

Transposing y to L.H.S and $\frac{5}{3}$ to R.H.S, we obtain

$$2y+y=\frac{26}{3}-\frac{5}{3}$$

$$3y=\frac{21}{3}=7$$

Dividing both sides by 3, we obtain

$$y=\frac{7}{3}$$

$$\text{L.H.S}=2y+\frac{5}{3}=2\times\frac{7}{3}+\frac{5}{3}=\frac{14}{3}+\frac{5}{3}=\frac{19}{3}$$

$$\text{R.H.S}=\frac{26}{3}-y=\frac{26}{3}-\frac{7}{3}=\frac{19}{3}$$

L.H.S. = R.H.S.

Hence, the result obtained above is correct.

Solution 10

$$3m=5m-\frac{8}{5}$$

Transposing $5m$ to L.H.S, we obtain

$$3m-5m=-\frac{8}{5}$$

$$-2m=-\frac{8}{5}$$

Dividing both sides by -2, we obtain

$$m=\frac{4}{5}$$

$$\text{L.H.S}=3\text{m}=3\times\frac{4}{5}=\frac{12}{5}$$

$$\text{R.H.S}=5m-\frac{8}{5}=5\times\frac{4}{5}-\frac{8}{5}=\frac{12}{5}$$

L.H.S. = R.H.S.

Hence, the result obtained above is correct.

Chapter 2 - Linear Equations in One Variable Exercise Ex. 2.4

Solution 1

Let the number be x.

According to the given question,

$$8\left(x-\frac{5}{2}\right)=3x$$

$8x-20=3x$

Transposing $3x$ to L.H.S and -20 to R.H.S, we obtain

$8x-3x=20$

$5x=20$

Dividing both sides by 5, we obtain

$x=4$

Hence, the number is 4.

Solution 2

Let the numbers be x and $5x$. According to the question,

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

$21+5x=2x+42$

Transposing $2x$ to L.H.S and 21 to R.H.S, we obtain

$5x-2x=42-21$

$3x=21$

Dividing both sides by 3, we obtain

$x=7$

$5x=5\times 7=35$

Hence, the numbers are 7 and 35 respectively.

Solution 3

Let the digits at tens place and ones place be x and $9-x$ respectively.

Therefore, original number $=10x+(9-x)=9x+9$

On interchanging the digits, the digits at ones place and tens place will be x and $9-x$ respectively.

Therefore, new number after interchanging the digits $=10(9-x)+x$

$=90-10x+x$

$=90-9x$

According to the given question,

New number = Original number + 27

$90-9x=9x+9+27$

$90-9x=9x+36$

Transposing $9x$ to R.H.S and 36 to L.H.S, we obtain

$90-36=18x$

$54=18x$

Dividing both sides by 18, we obtain

$3=x$ and $9-x=6$

Hence, the digits at tens place and ones place of the number are 3 and 6 respectively.

Therefore, the two-digit number is $9x+9=9\times 3+9=36$

Solution 4

Let the digits at tens place and ones place be x and $3x$ respectively.

Therefore, original number $= 10x + 3x = 13x$

On interchanging the digits, the digits at ones place and tens place will be x and $3x$ respectively.

Number after interchanging $= 10 \times 3x + x = 30x + x = 31x$

According to the given question,

Original number + New number = 88

$13x + 31x = 88$

$44x = 88$

Dividing both sides by 44, we obtain

$x = 2$

Therefore, original number $= 13x = 13 \times 2 = 26$

By considering the tens place and ones place as $3x$ and x respectively, the two-digit number obtained is 62.

Therefore, the two-digit number may be 26 or 62.

Solution 5

Let Shobo's age be x years. Therefore, his mother's age will be $6x$ years.

According to the given question,

$$\text{After 5 years, Shobo's age} = \frac{\text{Shobo's mother's present age}}{3}$$

$$x + 5 = \frac{6x}{3}$$

$$x + 5 = 2x$$

Transposing x to R.H.S, we obtain

$$5 = 2x - x$$

$$5 = x$$

$$6x = 6 \times 5 = 30$$

Therefore, the present ages of Shobo and Shobo's mother will be 5 years and 30 years respectively.

Solution 6

Let the common ratio between the length and breadth of the rectangular plot be x. Hence, the length and breadth of the rectangular plot will be $11x$ m and $4x$ m respectively.

Perimeter of the plot = 2(Length + Breadth) $= \left[2(11x + 4x)\right]$ m $= 30x$ m

It is given that the cost of fencing the plot at the rate of Rs 100 per metre is Rs 75, 000.

$\therefore 100 \times$ Perimeter $= 75000$

$100 \times 30x = 75000$

$3000x = 75000$

Dividing both sides by 3000, we obtain

$x = 25$

Length $= 11x$ m $= (11 \times 25)$ m $= 275$ m

Breadth $= 4x$ m $= (4 \times 25)$ m $= 100$ m

Hence, the dimensions of the plot are 275 m and 100 m respectively.

Solution 7

Let $2x$ m of trouser material and $3x$ m of shirt material be bought by him.

Per metre selling price of trouser material = $\text{Rs}\left(90 + \frac{90 \times 12}{100}\right) = \text{Rs } 100.80$

Per metre selling price of shirt material = $\text{Rs}\left(50 + \frac{50 \times 10}{100}\right) = \text{Rs } 55$

Given that, total amount of selling = Rs 36660

$100.80 \times (2x) + 55 \times (3x) = 36660$

$201.60x + 165x = 36660$

$366.60x = 36660$

Dividing both sides by 366.60, we obtain

$x = 100$

Trouser material $= 2x$ m $= (2 \times 100)$ m $= 200$ m

Solution 8

Let the number of deer be x.

Number of deer grazing in the field $= \frac{x}{2}$

$$\text{Number of deer playing nearby} = \frac{3}{4} \times \text{Number of remaining deer}$$
$$= \frac{3}{4} \times \left(x - \frac{x}{2} \right) = \frac{3}{4} \times \frac{x}{2} = \frac{3x}{8}$$

Number of deer drinking water from the pond $= 9$

$$x - \left(\frac{x}{2} + \frac{3x}{8} \right) = 9$$
$$x - \left(\frac{4x + 3x}{8} \right) = 9$$

$$x - \frac{7x}{8} = 9$$
$$\frac{x}{8} = 9$$

Multiplying both sides by 8, we obtain

$x = 72$

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

Solution 9

Let the granddaughter's age be x years. Therefore, grandfather's age will be

$10x$ years.

According to the question,

Grandfather's age = Granddaughter's age + 54 years

$10x = x + 54$

Transposing x to L.H.S, we obtain

$10x - x = 54$

$9x = 54$

$x = 6$

Granddaughter's age = x years = 6 years

Grandfather's age = $10x$ years = (10×6) years = 60 years

Solution 10

Let Aman's son's age be x years. Therefore, Aman's age will be $3x$ years. Ten years ago, their age was $(x-10)$ years and $(3x-10)$ years respectively.

According to the question,

10 years ago, Aman's age = 5 × Aman's son's age 10 years ago

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

$3x-10=5x-50$

Transposing $3x$ to R.H.S and 50 to L.H.S, we obtain

$50-10=5x-3x$

$40=2x$

Dividing both sides by 2, we obtain

$20=x$

Aman's son's age $=x$ years $=20$ years

Aman's age $=3x$ years $=(3\times 20)$ years $=60$ years

Chapter 2 - Linear Equations in One Variable Exercise Ex. 2.5

Solution 1

$$\frac{x}{2}-\frac{1}{5}=\frac{x}{3}+\frac{1}{4}$$

L.C.M. of the denominators, 2, 3, 4, and 5, is 60.

Multiplying both sides by 60, we obtain

$$60\left(\frac{x}{2}-\frac{1}{5}\right)=60\left(\frac{x}{3}+\frac{1}{4}\right)$$

$\Rightarrow 30x-12=20x+15$ (Opening the brackets)

$\Rightarrow 30x-20x=15+12$

$\Rightarrow 10x=27$

$\Rightarrow x=\frac{27}{10}$

Solution 2

$$\frac{n}{2}-\frac{3n}{4}+\frac{5n}{6}=21$$

L.C.M. of the denominators, 2, 4, and 6, is 12.

Multiplying both sides by 12, we obtain

$$6n-9n+10n=252$$

$$\Rightarrow 7n=252$$

$$\Rightarrow n=\frac{252}{7}$$

$$\Rightarrow n=36$$

Solution 3

$$x+7-\frac{8x}{3}=\frac{17}{6}-\frac{5x}{2}$$

L.C.M. of the denominators, 2, 3, and 6, is 6.

Multiplying both sides by 6, we obtain

$$6x+42-16x=17-15x$$

$$\Rightarrow 6x-16x+15x=17-42$$

$$\Rightarrow 5x=-25$$

$$\Rightarrow x=\frac{-25}{5}$$

$$\Rightarrow x=-5$$

Solution 4

$$\frac{x-5}{3}=\frac{x-3}{5}$$

L.C.M. of the denominators, 3 and 5, is 15.

Multiplying both sides by 15, we obtain

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

$\Rightarrow 5x-25=3x-9$ (Opening the brackets)

$\Rightarrow 5x-3x=25-9$

$\Rightarrow 2x=16$

$$\Rightarrow x=\frac{16}{2}$$
$$\Rightarrow x=8$$

Solution 5

$$\frac{3t-2}{4}-\frac{2t+3}{3}=\frac{2}{3}-t$$

L.C.M. of the denominators, 3 and 4, is 12.

Multiplying both sides by 12, we obtain

$3(3t-2)-4(2t+3)=8-12t$

$\Rightarrow 9t-6-8t-12=8-12t$ (Opening the brackets)

$\Rightarrow 9t-8t+12t=8+6+12$

$\Rightarrow 13t=26$

$$\Rightarrow t=\frac{26}{13}$$
$$\Rightarrow t=2$$

Solution 6

$$m-\frac{m-1}{2}=1-\frac{m-2}{3}$$

L.C.M. of the denominators, 2 and 3, is 6.

Multiplying both sides by 6, we obtain

$6m-3(m-1)=6-2(m-2)$

$\Rightarrow 6m-3m+3=6-2m+4$ (Opening the brackets)

$\Rightarrow 6m-3m+2m=6+4-3$

$\Rightarrow 5m=7$

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

Solution 7

$3(t-3)=5(2t+1)$

$\Rightarrow 3t-9=10t+5$ (Opening the brackets)

$\Rightarrow -9-5=10t-3t$

$\Rightarrow -14=7t$

$\Rightarrow t=\frac{-14}{7}$

$\Rightarrow t=-2$

Solution 8

$15(y-4)-2(y-9)+5(y+6)=0$

$\Rightarrow 15y-60-2y+18+5y+30=0$ (Opening the brackets)

$\Rightarrow 18y-12=0$

$\Rightarrow 18y=12$

$\Rightarrow y=\frac{12}{18}=\frac{2}{3}$

Solution 9

$3(5z-7)-2(9z-11)=4(8z-13)-17$

$\Rightarrow 15z-21-18z+22=32z-52-17$ (Opening the brackets)

$\Rightarrow -3z+1=32z-69$

$\Rightarrow -3z-32z=-69-1$

$\Rightarrow -35z=-70$

$\Rightarrow z=\frac{70}{35}=2$

Solution 10

$0.25(4f-3)=0.05(10f-9)$

$\frac{1}{4}(4f-3)=\frac{1}{20}(10f-9)$

Multiplying both sides by 20, we obtain

$5(4f-3)=10f-9$

$\Rightarrow 20f-15=10f-9$ (Opening the brackets)

$\Rightarrow 20f-10f=-9+15$

$\Rightarrow 10f=6$

$\Rightarrow f=\frac{3}{5}=0.6$

Chapter 2 - Linear Equations in One Variable Exercise Ex. 2.6

Solution 1

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

On multiplying both sides by $3x$, we obtain

$$8x-3=6x$$

$$\Rightarrow 8x-6x=3$$

$$\Rightarrow 2x=3$$

$$\Rightarrow x=\frac{3}{2}$$

Solution 2

$$\frac{9x}{7-6x}=15$$

Onmultiplying both sides by $7-6x$, we obtain

$$9x=15(7-6x)$$

$$\Rightarrow 9x=105-90x$$

$$\Rightarrow 9x+90x=105$$

$$\Rightarrow 99x=105$$

$$\Rightarrow x=\frac{105}{99}=\frac{35}{33}$$

Solution 3

$$\frac{z}{z+15}=\frac{4}{9}$$

On multiplying both sides by $9(z+15)$, we obtain

$$9z=4(z+15)$$

$$\Rightarrow 9z=4z+60$$

$$\Rightarrow 9z-4z=60$$

$$\Rightarrow 5z=60$$

$$\Rightarrow z=12$$

Solution 4

$$\frac{3y+4}{2-6y}=-\frac{2}{5}$$

On multiplying both sides by $5(2-6y)$, we obtain

$5(3y+4)=-2(2-6y)$

$\Rightarrow 15y+20=-4+12y$

$\Rightarrow 15y-12y=-4-20$

$\Rightarrow 3y=-24$

$\Rightarrow y=-8$

Solution 5

$$\frac{7y+4}{y+2}=-\frac{4}{3}$$

On multiplying both sides by $3(y+2)$, we obtain

$3(7y+4)=-4(y+2)$

$\Rightarrow 21y+12=-4y-8$

$\Rightarrow 21y+4y=-8-12$

$\Rightarrow 25y=-20$

$\Rightarrow y=-\frac{4}{5}$

Solution 6

Let the common ratio between their ages be x. Therefore, Hari's age and Harry's age will be $5x$ years and $7x$ years respectively and four years later, their ages will be $(5x+4)$ years and $(7x+4)$ years respectively.

According to the situation given in the question,

$$\frac{5x+4}{7x+4}=\frac{3}{4}$$

$$\Rightarrow 4(5x+4)=3(7x+4)$$
$$\Rightarrow 20x+16=21x+12$$
$$\Rightarrow 16-12=21x-20x$$
$$\Rightarrow 4=x$$

Hari's age $=5x$ years $=(5\times 4)$ years $=20$ years

Harry's age $=7x$ years $=(7\times 4)$ years $=28$ years

Therefore, Hari's age and Harry's age are 20 years and 28 years respectively.

Solution 7

Let the numerator of the rational number be x. Therefore, its denominator will

be $x+8$.

The rational number will be $\frac{x}{x+8}$. According to the question,

$$\frac{x+17}{x+8-1}=\frac{3}{2}$$
$$\Rightarrow \frac{x+17}{x+7}=\frac{3}{2}$$

$$\Rightarrow 2(x+17)=3(x+7)$$

$$\Rightarrow 2x+34=3x+21$$

$$\Rightarrow 34-21=3x-2x$$

$$\Rightarrow 13=x$$

Numerator of the rational number $=x=13$

Denominator of the rational number $=x+8=13+8=21$

Rational number $=\frac{13}{21}$