Chapter - 4
Linear Equation in one Variable

Exercise

In questions 1 to 15 out of the four options only one is correct, write the correct answer.

1. The solution of which of the following equations is neither a fraction nor an integer.
(a) $3x + 2 = 5x + 2$
(b) $4x – 18 = 2$
(c) $4x + 7 = x + 2$
(d) $5x – 8 = x + 4$

Solution:
(c) 4x + 7 = x + 2

On solving,
4x – x = 2 – 7
3x = – 5
x= $\frac{-5}{3}$

So, $\frac{-5}{3}$ is neither a fraction nor an integer.

2. The solution of the equation $ax + b = 0$ is
(a) $x = \frac{a}{b}$
(b) $x = -b$
(c) $x = \frac{-b}{a}$
(d) $x = \frac{b}{a}$

Solution:
(c) x = -b/a

Given,
ax + b = 0

Transposing b to RHS and it becomes -b
Then,
ax = -b

$x = \frac{-b}{a}$

3. If $8x - 3 = 25 + 17x$, then x is
(a) a fraction
(b) an integer
(c) a rational number
(d) cannot be solved

Solution:
(c) a rational number

Given,
$8x - 3 = 25 + 17x$

Transposing -3 to RHS and it becomes 3 and 17x to LHS it becomes -17x.
$8x - 17x = 25 + 3$
$-9x = 28$
$x = \frac{-28}{9}$
Therefore x is a rational number.

4. The shifting of a number from one side of an equation to other is called
(a) Transposition
(b) Distributivity
(c) Commutativity
(d) Associativity

Solution:
(a) Transposition
The shifting of a number from one side of an equation to other is called Transposition

5. If $\frac{5x}{3} - 4 = \frac{2x}{5}$, then the numerical value of $2x - 7$ is
(a) $\frac{19}{13}$
(b) $-\frac{13}{19}$
(c) 0
(d) $\frac{13}{19}$

Solution:

(b) $-\frac{13}{19}$

Given,

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

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

LCM of 3 and 5 is 15

$\frac{25x - 6x}{15} = 4$

$19x = 4 \times 15$

$19x = 60$

$x = \frac{60}{19}$

Then, Substitute the value of x in 2x -7

$= (2 \times (\frac{60}{19})) - 7$

$= (\frac{120}{19}) - 7$

$= \frac{-13}{19}$

6. The value of *x* for which the expressions 3*x* – 4 and 2*x* + 1 become equal is

(a) –3

(b) 0

(c) 5

(d) 1

Solution:

(c) 5

Given,

$3x - 4 = 2x + 1$

Transposing -4 to RHS and it becomes 4 and 2x to LHS it becomes -2x.

$3x - 2x = 1 + 4$

$x = 5$

7. If *a* and *b* are positive integers, then the solution of the equation *ax* = *b* has to be always
(a) positive
(b) negative
(c) one
(d) zero

Solution:
(a) positive

Let a = 3,
b = 4
So,
ax = b
3x = 4
x = 4/3

8. Linear equation in one variable has
(a) only one variable with any power.
(b) only one term with a variable.
(c) only one variable with power 1.
(d) only constant term.

Solution:
(c) only one variable with power 1.

9. Which of the following is a linear expression:
(a) x^2 + 1
(b) $y + y^2$
(c) 4
(d) 1 + *z*

Solution:
(d) 1 + z
The linear expressions is one which having highest power as 1.

10. A linear equation in one variable has
(a) Only one solution
(b) Two solutions
(c) More than two solutions
(d) No solution

Solution:

(a) Only one solution

11. Value of S in $\frac{1}{3}+S=\frac{2}{5}$

(a) $\frac{4}{5}$

(b) $\frac{1}{15}$

(c) 10

(d) 0

Solution:

(b) $\frac{1}{15}$

Given,

$\frac{1}{3}+S=\frac{2}{5}$

S = $S=\frac{6-5}{15}$

S = $\frac{1}{15}$

12. $\frac{-4}{3}y=-\frac{3}{4}$, then *y* =

(a) $-\left(\frac{3}{4}\right)^2$

(b) $-\left(\frac{4}{3}\right)^2$

(c) $\left(\frac{3}{4}\right)^2$

(d) $\left(\frac{4}{3}\right)^2$

Solution:

(c) $\left(\frac{3}{4}\right)^2$

Given,

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

$$Y = -\frac{3}{4} \times -\frac{3}{4}$$

$$Y = \frac{9}{16}$$

$$Y = \frac{3 \times 3}{4 \times 4}$$

$$Y = \left(\frac{3}{4}\right)^2$$

13. The digit in the tens place of a two digit number is 3 more than the digit in the units place. Let the digit at units place be *b*. Then the number is
(a)11*b* + 30
(b) 10*b* + 30
(c) 11*b* + 3
(d) 10*b* + 3

Solution:

(a) 11b + 30

Let the digit at units place be b.
The digit in the tens place of a two digit number is 3 more than the digit in the units place = 3 + b

So,
The number = 10 (3 + b) + b
= 30 + 10b + b
= 30 + 11b

14. Arpita's present age is thrice of Shilpa. If Shilpa's age three years ago was *x*. Then Arpita's present age is
(a) 3(*x* – 3)
(b) 3*x* + 3
(c)3*x* – 9
(d) 3(*x* + 3)

Solution:

(d) 3(x + 3)

Given,
Shilpa's age three years ago was x
Then,
Shilpa's present age is = x + 3
Arpita's present age is thrice of Shilpa = 3 (x + 3)

15. The sum of three consecutive multiples of 7 is 357. Find the smallest multiple.
(a) 112
(b) 126
(c) 119
(d) 116

Solution:
(a) 112

Let us assume the three consecutive multiples of 7 be 7x, (7x + 7), (7x + 14) where x is a natural number.

According to question,

7x + (7x + 7) + (7x + 14) = 357
21x + 21 = 357
21(x + 1) = 357
x + 1 = 17
x = 17 – 1
x = 16
Therefore, the smallest multiple of 7 is,
7 × 16 = 112.

In questions 16 to 32, fill in the blanks to make each statement true.

16. In a linear equation, the _____ power of the variable appearing in the equation is one.

Solution:-
In a linear equation, the highest power of the variable appearing in the equation is one.

17. The solution of the equation $3x - 4 = 1 - 2x$ is _____.

Solution:-
The solution of the equation 3x – 4 = 1 – 2 x is 1.

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

18. The solution of the equation $2y = 5y - \frac{18}{5}$ is _____.

Solution:

The solution of the equation $2y = 5y - \frac{18}{5}$ is $(\frac{6}{5})$.

$2y = 5y - (\frac{18}{5})$

$(\frac{18}{5}) = 5y - 2y$

$(\frac{18}{5}) = 3y$

$y = (\frac{18}{5}) \times (1/3)$

$y = (\frac{6}{5}) \times (1/1)$

$y = \frac{6}{5}$

19. Any value of the variable which makes both sides of an equationequal is known as a _____ of the equation.

Solution:-

Any value of the variable which makes both sides of an equation equal is known as a solution of the equation.

20. 9*x* – _____ = –21 has the solution (–2)

Solution:-

9x – 3 = –21 has the solution (–2)

In the question it is given that,
x = -2
Then, let us assume the missing number be y
(9 × (-2)) – y = -21
-18 – y = -21
– y = -21 + 18
– y = – 3
y = 3

21. Three consecutive numbers whose sum is 12 are _____, _____ and _____.

Solution:-
Three consecutive numbers whose sum is 12 are 3, 4 and 5.
3 + 4 + 5 = 12

22. The share of A when Rs 25 are divided between A and B so that A gets Rs. 8 more than B is _____.

Solution:-
The share of A when Rs 25 are divided between A and B so that A gets Rs. 8 more than B is Rs 16.50.

Let us assume B share be x
As per the condition in the question A share be x + 8
So,
x + (x + 8) = 25
x + x + 8 = 25
2x + 8 = 25
2x = 25 – 8
2x = 17
$x = \frac{17}{2}$
x = 8.5
So,
A gets x + 8
= 8.5 + 8
= Rs 16.5

23. A term of an equation can be transposed to the other side by changing its _____.

Solution:-
A term of an equation can be transposed to the other side by changing its sign.

For example:-
2x + 3 = 0
Transposing 3 to RHS and it becomes -3
2x = -3
$x = -\frac{3}{2}$

24. On subtracting 8 from *x*, the result is 2. The value of *x* is _____.

Solution:-
On subtracting 8 from x, the result is 2. The value of x is 10.

According to question,
On subtracting 8 from x, the result is 2,
x – 8 = 2
Transposing -8 to RHS and it becomes 8
x = 2 + 8
x = 10

25. $\frac{x}{5}+30=18$ **has the solution as _____.**

Solution:-

$(\frac{x}{5})$ + 30 = 18 has the solution as -60.

Given,

$(\frac{x}{5})$ + 30 = 18
Transposing 30 to RHS and it becomes -30.
$(\frac{x}{5})$ = 18 – 30
$(\frac{x}{5})$ = -12
x = -12 × 5
x = -60

26. When a number is divided by 8, the result is –3. The number is_____.

Solution:-
When a number is divided by 8, the result is –3. The number is -24.

Let the number be x,
So,
$\frac{x}{8}$ = -3
x = -3 × 8
x = -24

27. 9 is subtracted from the product of *p* and 4, the result is 11. Thevalue of *p* is _____.

Solution:-
9 is subtracted from the product of p and 4, the result is 11. The value of p is 5.

According to question,
9 is subtracted from the product of p and 4, the result is 4p – 9 = 11
4p – 9 = 11
Transposing -9 to RHS and it becomes 9.
4p = 11 + 9
4p = 20
$p = \frac{20}{4}$
p= 5

28. If $\frac{2}{5}x - 2 = 5 - \frac{3}{5}x$, then *x* = _____.

Solution:-
If $\frac{2}{5}x - 2 = 5 - \frac{3}{5}x$, then x = 7

Given,
$\frac{2}{5}x - 2 = 5 - \frac{3}{5}x$ Transposing -2 to RHS and it becomes 2 and $(\frac{3}{5})$x to LHS it becomes $-\frac{3}{5}$x.
$(\frac{2}{5})$x + $(\frac{3}{5})$x = 5 + 2
5x = 7 × 5
x = 35/5
x = 7

29. After 18 years, Swarnim will be 4 times as old as he is now. His present age is _____.

Solution:-

After 18 years, Swarnim will be 4 times as old as he is now. His present age is 6 years.

Let us assume swarnim's parent age be x year.
So,
After 18 year, Swarnim's age = (x + 18) year
According to the question,
x + 18 = 4x
x – 4x = -18
– 3x = -18

$-\frac{3x}{3} = (-18/3)$

x = 6

Therefore, swarnim's present age is 6 year.

30. Convert the statement. Adding 15 to 4 times *x* is 39 into an equation_____.

Solution:-

Convert the statement adding 15 to 4 times x is 39 into an equation 4x + 15 = 39.

31. The denominator of a rational number is greater than the numerator by 10. If the numerator is increased by 1 and the denominator is decreased by 1, then expression for new denominator is _____.

Solution:-

The denominator of a rational number is greater than the numerator by 10. If the numerator is increased by 1 and the denominator is decreased by 1, then expression for new denominator is x + 9.

Let us assume numerator be x,
So,
Denominator = x + 10

Rational number = $\frac{x}{x + 10}$

As per the condition given in the question, the numerator is increased by 1 and the denominator is decreased by 1.

New rational number = $\frac{\text{Numerator}+1}{\text{Denominator-1}}$

$= \frac{x+1}{x + 10-1}$

$= \frac{x+1}{x+9}$

The new denominator is x + 9.

32. The sum of two consecutive multiples of 10 is 210. The smaller multiple is _____.

Solution:

The sum of two consecutive multiples of 10 is 210. The smaller multiple is 100.

Let us assume the two consecutive multiples of 10 be 10x and 10x + 10.
So,
Sum of two consecutive multiples of 10
10x + 10x + 10 = 210
20x + 10 = 210
20x = 210 – 10
20x = 200
$x = \frac{200}{20}$
x = 10
The two consecutive multiples of 10 are 10x = 10 × 10
= 100
10x + 10 = (10 × 10) + 10
= 110
Hence, the smaller multiple of 10 is 100.

In questions 33 to 48, state whether the statements are true (T) or false (F).

33. 3 years ago, the age of a boy was *y* years. His age 2 years ago was *(y* – 2) years.

Solution:-

False.
Because, His age 2 years ago was (y + 1) years.

34. Shikha's present age is *p* years. Reemu's present age is 4 times the present age of Shikha. After 5 years Reemu's age will be 15*p* years.

Solution:-

False.

Given,
Shikha's present age is p years
Reemu's present age is 4 times the present age of Shikha = 4p
After 5 years Reemu's age will be = (4p + 5)

35. In a 2 digit number, the units place digit is *x*. If the sum of digits be 9, then the number is (10*x* – 9).

Solution:-

False.
From the question it is given that,
The unit's place digit is = x
Sum of two digits = 9
So,
Ten's digit = 9 – x
So,
The number = 10 (9 – x) + x
= 90 – 10x + x
= 90 – 9x

36. Sum of the ages of Anju and her mother is 65 years. If Anju's present age is *y* years then her mother's age before 5 years is (60 – *y*) years.

Solution:-

True.
We have,
Anju's present age = y years
Present age of Anju's mother = (65 – y) years
So,
Before 5 years, Anju's mother age = 65 – y – 5
= (60 – y) years

37. The number of boys and girls in a class are in the ratio 5:4. If the number of boys is 9 more than the number of girls, then number of boys is 9.

Solution:-

False.
Let us assume number of boys be 5y and the number of girls be 4y.
We have,
5x – 4x = 9
x = 9
Number of boys = 5x
= 5 × 9
= 45 boys
Number of girls = 4x
= 4 × 9
= 36 girls.

38. A and B are together 90 years old. Five years ago A was thrice as old as B was. Hence, the ages of A and B five years back would be (x – 5) years and (85 – x) years respectively.

Solution:-

True.
Let us assume age of A be y years.
So,
Age of B = (90 – y) years.
Before 5 years A's age = (x – 5) years
and
B's age = (90 – x – 5)
= (85 – x) years.

39. Two different equations can never have the same answer.

Solution:

False.
Two different equations can have the same answer.

40. In the equation 3x – 3 = 9, transposing –3 to RHS, we get 3x = 9.

Solution:-

False.
Given,
3x – 3 = 9
Transposing –3 to RHS it becomes 3
3x = 9 + 3
3x = 12

41. In the equation 2x = 4 – x, transposing –x to LHS, we get x = 4.

Solution:-

False.
Given,
2x = 4 – x
Transposing –x to LHS it becomes x
2x + x = 4
3x = 4

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

42. If $\frac{15}{8} - 7x = 9$, then, then $-7x = 9 + \frac{15}{8}$.

Solution:-

False.
Given,
$(\frac{15}{8}) - 7x = 9$
Transposing $\frac{15}{8}$ to RHS it becomes $-(\frac{15}{8})$
$-7x = 9 - (\frac{15}{8})$

43. If $\frac{x}{3} + 1 = \frac{7}{15}$, then $\frac{x}{3} = \frac{6}{15}$.

Solution:-

False.
Given,
$\frac{x}{3} + 1 = \frac{7}{15}$
Transposing 1 to RHS it becomes – 1
$(\frac{x}{3}) = (\frac{7}{15}) - 1$
$(\frac{x}{3}) = \frac{-8}{15}$

44. If 6*x* = 18, then 18*x* = 54.

Solution:-

True.
Given, 6x = 18
Multiplying both LHS and RHS by 3,
we get,
6x × 3 = 18 × 3
18x = 54

45. If $\frac{x}{11} = 15$, then $x = \frac{11}{15}$

Solution:-

False.

46. If *x* is an even number, then the next even number is 2(*x* + 1).

Solution:-

False.
If x is an even number, then the next even number is (x + 2)

47. If the sum of two consecutive numbers is 93 and one of them is *x*, then the other number is 93 – *x*.
Solution:-

False.
We have,
The sum of two consecutive numbers is 93
Two consecutive number are = x and 93 – x
So,
Sum of two consecutive numbers,
x + 93 – x = 93
Transposing 93 to RHS it becomes – 93
x – x = 93 -93
0 = 0

48. Two numbers differ by 40, when each number is increased by 8, the bigger becomes thrice the lesser number. If one number is *x*, then the other number is (40 – *x*).

Solution:-

False.
We have,
One number = x
Other number = 40 –x
Let us assume (40 – x) > x
So,
40 – x + 8 = 3 (x + 8)
48 – x = 3x + 24
– x – 3x = 24 -48
– 4x = -24

$x = -24 \times (\frac{-1}{4})$

$x = 6$

One number is x = 6

Other number is = 40 – x

= 40 – 6

= 34

Difference between numbers = 34 – 6

= 28

Solve the following:

49. $\frac{3x-8}{2x}=1$

Solution:-

We have,

$\frac{3x-8}{2x}=1$

By cross multiplication, we get

(3x – 8) = 2x

Transposing -8 to RHS it becomes 8 and 2x to LHS it becomes – 2x

3x – 2x = 8

x = 8

50. $\frac{5x}{2x-1}=2$

Solution:

We have,

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

By cross multiplication,

5x = 2 × (2x – 1)

5x = 4x – 2

Transposing 4x to LHS it becomes – 4x

5x – 4x = -2

x = -2

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

Solution:

We have,

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

By cross multiplication, we get
$3 \times (2x - 3) = 1 \times (4x + 5)$
$6x - 9 = 4x + 5$

Transposing -9 to RHS it becomes 9 and 4x to LHS it becomes – 4x.
$6x - 4x = 5 + 9$
$2x = 14$
$x = 7$

52. $\frac{8}{x}=\frac{5}{x-1}$

Solution:

We have,
$$\frac{8}{x}=\frac{5}{x-1}$$

By cross multiplication, we get
$8 \times (x - 1) = 5 \times x$
$8x - 8 = 5x$

Transposing -8 to RHS it becomes 8 and 5x to LHS it becomes – 5x.
$8x - 5x = 8$
$3x = 8$
$x = \frac{8}{3}$

53. $\frac{5(1-x)+3(1+x)}{1-2x}=8$

Solution:

We have,
$$\frac{5(1-x)+3(1+x)}{1-2x}=8$$

By cross multiplication, we get
$(5(1 - x)) + (3(1 + x)) = 8 \times (1 - 2x)$
$5 - 5x + 3 + 3x = 8 - 16 x$
$8 - 2x = 8 - 16x$
Transposing 8 to RHS it becomes – 8 and -16x to LHS it becomes 16x.
$16x - 2x = 8 - 8$
$14x = 0$

x = 0

54. $\frac{0.2x+5}{3.5x-3}=\frac{2}{5}$

Solution:

We have,

$\frac{0.2x+5}{3.5x-3}=\frac{2}{5}$

By cross multiplication, we get

$5 \times (0.2x + 5) = 2 \times (3.5x – 3)$

$x + 25 = 7x – 6$

Transposing x to RHS it becomes – x and -6 to LHS it becomes 6.

$25 + 6 = 7x – x$

$31 = 6x$

$x = \frac{31}{6}$

55. $\frac{y-(4-3y)}{2y-(3+4y)}=\frac{1}{5}$

Solution:

We have,

$\frac{y-(4-3y)}{2y-(3+4y)}=\frac{1}{5}$

$(y – 4 + 3y)/ (2y – 3 – 4y) = \frac{1}{5}$

$(-4y – 4)/ (2y – 3) = \frac{1}{5}$

By cross multiplication, we get

$5 \times (-4y – 4) = 1 \times (2y – 3)$

$20y – 20 = 2y – 3$

Transposing – 20 to RHS it becomes 20 and 6y to LHS it becomes -6y.

$20y – 2y = 20 – 3$

$22 y = 17$

$y = \frac{17}{2}$

56. $\frac{x}{5}=\frac{x-1}{6}$

Solution:

We have,

$$\frac{x}{5} = \frac{x-1}{6}$$

By cross multiplication, we get

$6 \times x = 5 \times (x - 1)$

$6x = 5x - 5$

Transposing 5x to RHS it becomes -5x

$6x - 5x = -5$

$x = -5$

57. $0.4(3x - 1) = 0.5x + 1$

Solution:

We have,

$0.4(3x - 1) = 0.5x + 1$

$1.2x - 0.4 = 0.5x + 1$

Transposing – 0.4 to RHS it becomes 0.4 and 0.5x to LHS it becomes -0.5x.

$1.2x - 0.5x = 1 + 0.4$

$0.7x = 1.4$

$x = 2$

58. $8x - 7 - 3x = 6x - 2x - 3$

Solution:

According to question,

$8x - 7 - 3x = 6x - 2x - 3$

$5x - 7 = 4x - 3$

Transposing – 7 to RHS it becomes 7 and 4x to LHS it becomes -4x.

$5x - 4x = 7 - 3$

$x = 4$

59. $10x - 5 - 7x = 5x + 15 - 8$

Solution:

We have,

$10x - 5 - 7x = 5x + 15 - 8$

$3x - 5 = 5x + 7$

Transposing – 5 to RHS it becomes 5 and 5x to LHS it becomes -5x.

$3x - 5x = 7 + 5$

$-2x = 12$

x = – 6

60. $4t - 3 - (3t + 1) = 5t - 4$

Solution:

We have,
4t – 3 – (3t +1) = 5t – 4
4t – 3 – 3t – 1 = 5t – 4
t – 4 = 5t – 4

Transposing t to RHS it becomes -t and -4 to LHS it becomes 4.
4 – 4 = 5t – t
0 = 4t
t = 0

61. $5(x - 1) - 2(x + 8) = 0$

Solution:

We have,
5(x – 1) – 2(x + 8) = 0
5x – 5 – 2x – 16 = 0
3x – 21 = 0

Transposing -21 to RHS it becomes 21.
3x = 21
x = 7

62. $\frac{x}{2}-\frac{1}{4}\left(x-\frac{1}{3}\right)=\frac{1}{6}(x+1)+\frac{1}{12}$

Solution:

$$\frac{x}{2}-\frac{1}{4}\left(x-\frac{1}{3}\right)=\frac{1}{6}(x+1)+\frac{1}{12}$$

$$\frac{x}{2}-\frac{x}{4}+\frac{1}{12}=\frac{x}{6}+\frac{1}{6}+\frac{1}{12}$$

$$\frac{x}{4}-\frac{x}{6}=\frac{1}{6}$$

$$\frac{6x-4x}{24}=\frac{1}{6}$$

$$\frac{2x}{24}=\frac{1}{6}$$

$$x=2$$

63. $\frac{1}{2}(x+1)+\frac{1}{3}(x-1)=\frac{5}{12}(x-2)$

Solution:

$$\frac{1}{2}(x+1)+\frac{1}{3}(x-1)=\frac{5}{12}(x-2)$$
$$\frac{x}{2}+\frac{1}{2}+\frac{x}{3}-\frac{1}{3}=\frac{5x}{12}-\frac{5}{6}$$
$$\frac{x}{2}+\frac{x}{3}-\frac{5x}{12}=\frac{1}{3}-\frac{1}{2}-\frac{5}{6}$$
$$\frac{5x}{12}=-\frac{6}{6}$$
$$x=\frac{-12}{5}$$

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

Solution:

$$\frac{x+1}{4}=\frac{x-2}{3}$$
$$3(x+1)=4(x-2)$$
$$3x+3=4x-8$$
$$-x=-11$$
$$x=11$$

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

Solution:

$$\frac{2x-1}{5}=\frac{3x+1}{3}$$
$$3(2x-1)=5(3x+1)$$
$$6x-3=15x+5$$
$$6x-15x=8$$
$$-9x=8$$
$$x=\frac{-8}{9}$$

66. $1-(x-2)-[(x-3)-(x-1)]=0$

Solution:

From the given equation-

1 –(x – 2) – [(x – 3) – (x – 1)] = 0
1-x+2-x+3+x-1 = 0
5-x = 0
x =5

67. $3x-\frac{x-2}{3}=4-\frac{x-1}{4}$

Solution:

$$3x-\frac{x-2}{3}=4-\frac{x-1}{4}$$
$$\frac{9x-x+2}{3}=\frac{16-x+1}{4}$$
$$4(8x+2)=3(17-x)$$
$$32x+8=51-3x$$
$$35x=43$$
$$x=\frac{43}{35}$$

68. $\frac{3t+5}{4}-1=\frac{4t-3}{5}$

Solution:

$$\frac{3t+5}{4}-1=\frac{4t-3}{5}$$
$$\frac{3t+5-4}{4}=\frac{4t-3}{5}$$
$$\frac{3t+1}{4}=\frac{4t-3}{5}$$
$$5(3t+1)=4(4t-3)$$
$$15t+5=16t-12$$
$$-t=-17$$
$$t=17$$

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

Solution:

$$\frac{2y-3}{4}-\frac{3y-5}{2}=y+\frac{3}{4}$$
$$\frac{2y-3-2(3y-5)}{4}=\frac{4y+3}{4}$$
$$2y-3-6y+10=4y+3$$
$$-4y+7=4y+3$$
$$8y=4$$
$$y=\frac{1}{2}$$

70. 0.25 (4*x* – 5) = 0.75*x* + 8

Solution:
From the given equation-

$$0.25\,(4x-5)=0.75x+8$$

$$x-1.25=0.75x+8$$
$$x-0.75x=8+1.25$$
$$0.25x=9.25$$
$$x=37$$

71. $\frac{9-3y}{1-9y}=\frac{8}{5}$

Solution:

$$\frac{9-3y}{1-9y}=\frac{8}{5}$$
$$5(9-3y)=8(1-9y)$$
$$45-15y=8-72y$$
$$45-8=15y-72y$$
$$37=-57y$$
$$y=\frac{-37}{57}$$

72. $\frac{3x+2}{2x-3}=-\frac{3}{4}$

Solution:

$$\frac{3x+2}{2x-3}=-\frac{3}{4}$$
$$4(3x+2)=-3(2x-3)$$
$$12x+8=-6x+9$$
$$18x=9-8$$
$$18x=1$$
$$x=\frac{1}{18}$$

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

Solution:

$$\frac{5x+1}{2x}=-\frac{1}{3}$$
$$3(5x+1)=-2x$$
$$15x+3=-2x$$
$$17x=-3$$
$$x=\frac{-3}{17}$$

74. $\frac{3t-2}{3}+\frac{2t+3}{2}=t+\frac{7}{6}$

Solution:

$$\frac{3t-2}{3}+\frac{2t+3}{2}=t+\frac{7}{6}$$
$$\frac{2(3t-2)+3(2t+3)}{6}=\frac{6t+7}{6}$$
$$2(3t-2)+3(2t+3)=6t+7$$
$$6t-4+6t+9=6t+7$$
$$6t=7-5$$
$$6t=2$$
$$t=\frac{2}{6}$$
$$t=\frac{1}{3}$$

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

Solution:

$$m-\frac{m-1}{2}=1-\frac{m-2}{3}$$
$$\frac{2m-(m-1)}{2}=\frac{3-(m-2)}{3}$$
$$3[2m-(m-1)]=2[3-(m-2)]$$
$$3(m+1)=2(5-m)$$
$$3m+3=10-2m$$
$$5m=7$$
$$m=\frac{7}{5}$$

76. 4 (3*p* + 2) – 5(6*p* –1) = 2(*p* – 8) – 6(7*p* – 4)

Solution:

From the given equation-

4 (3p + 2) – 5(6p –1) = 2(p – 8) – 6(7p – 4)

12 p + 8 - 30 p + 5 = 2 p -16 - 42 p + 24

-18 p +13 = -40 p + 8

-18p + 40 p = 8 -13

22p = -5

p = $\frac{-5}{22}$

77. 3 (5*x* – 7) + 2(9*x* – 11) = 4(8*x* – 7) – 111

Solution:

From the given equation-

$3(5x-7)+2(9x-11)=4(8x-7)-111$

$15x-21+18x-22=32x-28-111$

$33x-43=32x-139$

$33x-32x=-139+43$

$x=-96$

78. 0.16 (5*x* – 2) = 0.4*x* + 7

Solution:

We have,

$0.16(5x-2)=0.4x+7$

$0.8x-0.32=0.4x+7$

$0.8x-0.4x=7+0.32$

$0.4x=7.32$

$x=18.3$

79. Radha takes some flowers in a basket and visits three temples one by one. At each temple, she offers one half of the flowers from the basket. If she is left with 3 flowers at the end, find the number of flowers she had in the beginning.

Solution:

Let ‘x’ be the total no. of flowers Radha at first.

No. of flowers remained with her after visit to the first temple = $\frac{x}{2}$

No. of flowers remained with her after visit to the second first temple = $\frac{x}{4}$

No. of flowers remained with her after visit to the third first temple = $\frac{x}{8}$

Flowers remaining at last= 3

According to question,

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

$8x-7x=24$

$x=24$

So, total number of flowers at the beginning =24

80. Rs. 13500 are to be distributed among Salma, Kiran and Jenifer in such a way that Salma gets Rs. 1000 more than Kiran and Jenifer gets Rs. 500 more than Kiran. Find the money received by Jenifer.

Solution:

Let 'x' be the amount received by Kiran.
Then,
The amount received by Salma is 1000 more than Kiran= (x+1000)
The amount received by Jennifer is 500 more than Kiran= (x+500)
If total amount given is 13500 then = (x+x+1000+x+500= 13500)

Now add the entire amount and equate the total amount-
3x+1500=13500
3x=13500-1500
3x=12000
x= 4000
Therefore,
Jennifer received= x+500
= 4000+500
= 4500Rs.
Salma received= x+1000
=4000+1000
= 5000Rs.

81. The volume of water in a tank is twice of that in the other. If we draw out 25 litres from the first and add it to the other, the volumes of the water in each tank will be the same. Find the volume of water in each tank.

Solution:

Let 'x' be the volume of water in the second tank.
The volume of water in the first tank be 2x.
As per question,
2x-25 = x+25
2x-x = 25+25
x= 50
The volume of water in the second take is 50 ltr.
Volume of water in the first tank = 2x
= 2x50
= 100
Therefore, the volume of water in the first tank is 100ltr.

82. Anushka and Aarushi are friends. They have equal amount of money in their pockets. Anushka gave $\frac{1}{3}$ of her money to Aarushi as herbirthday gift. Then Aarushi gave a party at a restaurant and clearedthe bill by paying half of the total money with her. If the remainingmoney in Aarushi's pocket is Rs.1600, find the sum gifted byAnushka.

Solution:

Let Anushka and Aarushi have equal money = x

After giving of $\frac{1}{3}$ money from anushka to aarushi,

Amount of aarushi = $x+\frac{x}{3}$

According to question,

$$x+\frac{x}{3}-\frac{1}{2}\left(x+\frac{x}{3}\right)=1600$$

$$x+\frac{x}{3}\left(1-\frac{1}{2}\right)=1600$$

$$\left(x+\frac{x}{3}\right)\times\frac{1}{2}=1600$$

$$\frac{4x}{3}=3200$$

$$x=2400$$

$$\text{So, money gifted by anushka} = \frac{1}{3}\times 2400$$

$$= 800\,rupees$$

83. Kaustubh had 60 flowers. He offered some flowers in a temple and found that the ratio of the number of remaining flowers to that of flowers in the beginning is 3:5. Find the number of flowers offered by him in the temple.

Solution:

Ratio of the flowers remained to that of flowers in the beginning given is= 3:5
So,
The number of flowers remained= 3x
Total flowers at the beginning= 5x
No. of total flowers given with Kaustubh= 60
Therefore,
5x= 60

x= 12

No. of flowers remained after offering in the temple
=3 x *x*
= 3 x 12
= 36

No. of flowers offered by Kaustubh in the temple
= 6 – 32
= 24.

84. The sum of three consecutive even natural numbers is 48. Find the greatest of these numbers.

Solution:

Let us assume three consecutive even numbers of series to be-
x, x+2 and x+4
So,
The sum of consecutive even numbers= x + x+2 + x+4
48= 3x + 6
-3x = 6 – 48
-3x = -42
x= 14

Therefore,
Three consecutive even numbers= x, x+2 and x+4.
x+2= 14+2
= 16
x+4= 14+4
= 18, which is the biggest number in the series.

85. The sum of three consecutive odd natural numbers is 69. Find the prime number out of these numbers.

Solution:

Let us assume three consecutive odd numbers of series to be-
x, x+2 and x+4

So, the sum of consecutive even numbers= x + x+2 + x+4= 69
3x + 6= 69
3x = 69-6
3x = 63
x= 21

Therefore, Three consecutive odd numbers= x, x+2 and x+4
x+2= 21+2
= 23
x+4= 21+4
= 25
Prime number= 23.

86. The sum of three consecutive numbers is 156. Find the number which is a multiple of 13 out of these numbers.

Solution:

Let us assume three consecutive numbers of series be- x, x+1 and x+2
So,
The sum of consecutive even numbers= x + x+1 + x+2= 156
3x + 3= 156
3x = 156-3
3x = 153
x= 51

Three consecutive odd numbers= x, x+1 and x+2.
x+1= 51+1
= 52
x+2= 51+2
= 53
Therefore, among the three, 52 is the multiple of 3.

87. Find a number whose fifth part increased by 30 is equal to its fourth part decreased by 30.

Solution:

Let the number be x
We have,

$$\frac{x}{5}+30=\frac{x}{4}-30$$

$$\frac{x}{5}-\frac{x}{4}=-30-30$$

$$\frac{4x-5x}{20}=-60$$

$$x=1200$$

The required number is = 1200

88. Divide 54 into two parts such that one part is $\frac{2}{7}$ of the other.

Solution:

Let the other part be x
So,

The first part = $\frac{2x}{7}$

According to question,

$$x + \frac{2x}{7} = 54$$

$$\frac{7x + 2x}{7} = 54$$

$$9x = 54 \times 7$$

$$x = 42$$

So,

$$First\ part = \frac{2x}{7}$$

$$= \frac{2 \times 42}{7}$$

$$= 12$$

Second part = 42

89. Sum of the digits of a two-digit number is 11. The given number is less than the number obtained by interchanging the digits by 9. Find the number.

Solution:

Let 'x' be the unit digit
Then, the ten's digit= 11 – x
Therefore,
Number = 10 (11 – x) + x
= 110 – 10x + x
= 110 – 9x
No. obtained by interchanging the digits =10x + (11 – x)
= 9x +11
According to question,
9x +11- (110 - 9x) = 9
9x +11-110 + 9x = 9
18x +11-110 = 9
18x = 9 -11+110
18x = 108
x = 6
Hence, unit's digit= 6
and

ten's digit= 11 – 6
= 5
Therefore, the required number is 56.

90. Two equal sides of a triangle are each 4m less than three times the third side. Find the dimensions of the triangle, if its perimeter is 55m.

Solution:

Let 'x' be the third number.
Then,
(3x – 4) will be one of the equal sides.

We have,
55= x+2(3x-4)
55= x+6x-8
55= 7x-8
55+8= 7x
63= 7x
9= x

Therefore, The third side = x = 9m.
Hence,
The equal two sides = (3x – 4)
= (3 x 9 – 4)
= 27 – 4
= 23m each.

91. After 12 years, Kanwar shall be 3 times as old as he was 4 years ago. Find his present age.

Solution:

Let Kanwar's present age be= x
So,
4 years ago his age would be= x – 4 years
After 12 years his age would be= 12 + x years

According to the question:
12 + x= 3 (x – 4)
12 + x= 3x – 12
x – 3x= -12 – 12
-2x= -24
x= 12

Hence, the present age of Kanwar is 12 years.

92. Anima left one-half of her property to her daughter, one-third to her son and donated the rest to an educational institute. If the donation was worth Rs. 1,00,000, how much money did Anima have?

Solution:

Let Anima property be x
So,

Property left for her daughter = $\frac{x}{2}$

Remaining property :

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

$= \frac{x}{2}$

Property left for her son = 1/3 of remaining property

$$= \frac{1}{3} \times \frac{x}{2}$$

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

$$\text{Remaining property} = \left[x - \left(\frac{x}{2} + \frac{x}{6} \right) \right]$$

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

As, remaining property is donated to educational institute.
Also,
Remaining property = 100000

$$\text{Remaining property} = \frac{x}{3}$$

$$100000 = \frac{x}{3}$$

$$x = 300000$$

93. If $\frac{1}{2}$ is subtracted from a number and the difference is multiplied by 4, the result is 5. What is the number?

Solution:

Let the number be x
According to question,

$$4\left(x-\frac{1}{2}\right)=5$$
$$4x-2=5$$
$$4x=7$$
$$x=\frac{7}{4}$$

94. The sum of four consecutive integers is 266. What are the integers?

Solution:

Let us take x, x+1, x+2 and x+3 as four consecutive integers
We have,
x + x+1 + x+2 + x+3= 266
4x + 6= 266
4x= 266-6
4x= 260
x = 65
Therefore, the 4 consecutive integers are-
x= 65,

x+1= 65+1
= 66
x+2= 65+2
= 67,
x+3= 65+3
= 68

95. Hamid has three boxes of different fruits. Box A weighs $2\frac{1}{2}$ kg more than Box B and Box C weighs $10\frac{1}{4}$ kg more than Box B. The total weight of the three boxes is $48\frac{3}{4}$ kg. How many kilograms (kg) does Box A weigh?

Solution:

Let the weight of the box A be x kg.
We have,
weight of box A = weight of box B + $\frac{5}{2}$
weight of box B = x -5/2
weight of box C = weight of box B + $\frac{41}{4}$ kg

weight of box C = x +31/4 kg (putting value of B)

The total weight of the three boxes is = $\frac{195}{4}$ kg

$$x + x - \frac{5}{2} + x + \frac{31}{4} = \frac{195}{4}$$

$On\ solving,$

$$x = \frac{29}{2}$$

$$x = 14\frac{1}{2} kg$$

96. The perimeter of a rectangle is 240 cm. If its length is increased by 10% and its breadth is decreased by 20%, we get the same perimeter. Find the length and breadth of the rectangle.

Solution:

Perimeter of the rectangle given= 240 cm

According to the question-
2(L+ B) = 240
L+ B = 120
Let x cm be the length of the rectangle
and,
Breadth = (120 –x)
Now,
New length of rectangle = x + 10% of x

$$= \frac{110}{100} x$$

New breadth = (120 –x) – 20% of (120 –x)

$$= \frac{80}{100}(120 - x)$$

We have,
2 (New length + New breadth) = 240

$$2\left[\frac{110}{100} x + \frac{80}{100}(120 - x)\right] = 240$$

$On\ solving,$

$$x = 80\, cm$$

So,
Length = 80cm
And
Breadth = 120 – 80

= 40 cm

97. The age of A is five years more than that of B. 5 years ago, the ratio of their ages was 3:2. Find their present ages.

Solution:

Let B's age= x
A's age= x+5
5 years ago, the ratio was 3:2

As per the question:

$$\frac{3}{2}=\frac{x+5}{x}$$

3x = 2(x + 5)
3x = 2x +10
3x - 2x = 10
x = 10
B's age= 10 years.
A's age= 10+5
= 15years 5 years later,
B's age= x+5
= 10+5
= 15 years.
A's age= x+5+5
=10+5+5
= 20 years.

98. If numerator is 2 less than denominator of a rational number and when 1 is subtracted from numerator and denominator both, the rational number in its simplest form is $\frac{1}{2}$. What is the rational number?

Solution:

Suppose the denominator of the rational number is x.
Then,
According to the question,
Numerator = Denominator – 2
= x – 2.
Now,

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

2(x -2 - 1) = x -2

x = 5

Hence, the denominator= 5
and
Numerator is 5 – 2 = 3.
Therefore,
The rational number = $\frac{3}{5}$

99. In a two digit number, digit in units place is twice the digit in tensplace. If 27 is added to it, digits are reversed. Find the number.

Solution:

Let x= 10th place digit and y= unit place digit of a two – digit number.
The two digit number= 10x + y
Reversed number= 10y + x

According to the question:
y= 2x ……(i)
Given that,
10x + y + 27= 10y + x
9y – 9x = 27
y – x= 3
y= 3 + x ……(ii)

Putting the value of y from (i) in (ii)
2x = 3 + x
2x – x= 3
x= 3
Therefore, y= 2x
= 2 x 3
= 6.
Hence, the two digit number= 10x + y
= 10 x 3+6
= 36.

100. A man was engaged as typist for the month of February in 2009. Hewas paid Rs. 500 per day but Rs. 100 per day were deducted for thedays he remained absent. He received Rs. 9,100 as salary for themonth. For how many days did he work?

Solution:

Number of days in the month of February in 2009 was 28 days.

His total salary of being present is 28x500= 14000
Salary received by him 9100.

So the number of days he was absent = $\frac{14000-9100}{100}$

$= \frac{4900}{100}$

$= 49$

So, he was absent for 49 days.

101. A steamer goes downstream and covers the distance between two ports in 3 hours. It covers the same distance in 5 hours when it goes upstream. If the stream flows at 3 km/hr, then find what is the speed of the steamer upstream?

Solution:

Let the steamer speed be x.
Speed of the stream= 3km/h
Downstream speed= (x + 3) km/h
Upstream speed= (x – 3) km/h

Distance covered in 3 hrs by steamer downstream = distance covered in 5hr by steamer upstream
3 (x + 3) = 5 (x – 3)
3x + 9 = 5 x – 15
2x = 24
x= 12
Hence, speed of steamer upstream= (x – 3)
= (12 – 3)
= 9 km/h.

102. A lady went to a bank with Rs. 1,00,000. She asked the cashier to give her Rs. 500 and Rs. 1,000 currency notes in return. She got 175 currency notes in all. Find the number of each kind of currency notes.

Solution:

Total no. of currency notes given= 175
Total amount with lady= 100000
Let,
Total no. of 500 notes be ‘x’
Then,
The total no. of 1000 notes would be= 175 – x
According to the question-
500x + (175 – x) 1000= 100000

500x + 175000 – 1000x = 100000
-500x= 100000 – 175000
x= 150
Therefore, total no. of Rs. 500 notes= 150.
Total no. of Rs 1000 notes= 175 – 150
= 25.

103. There are 40 passengers in a bus, some with Rs. 3 tickets and remaining with Rs.10 tickets. The total collection from these passengers is Rs. 295. Find how many passengers have tickets worth Rs. 3?

Solution:

Total no. of passengers= 40
No. of teachers having ticket worth Rs 3= x
Then, the no. of passengers having tickets worth Rs 10= (40 – x)
Total collection from passengers= Rs 295
Now,
3x + 10 (40 –x) = 295
3x+400-10x= 295
-7x=295-400
-7x=-105
x= 15

Hence, the no. of passengers having tickets worth Rs 3 is 15.

104. Denominator of a number is 4 less than its numerator. If 6 is added to the numerator it becomes thrice the denominator. Find the fraction.

Solution:

Let x be the numerator
and
x – 4 be the denominator
Therefore,
Fraction= $\frac{x}{x-4}$
According to the question, if 6 is added to the numerator, it becomes thrice the denominator.
Therefore,
x + 6= 3 (x – 4)
3x – 12 = x + 6
3x-x = 6+12
2x = 18
x= 9

Hence,

The fraction $= \frac{x}{x-4}$

$= \frac{9}{5}$

105. An employee works in a company on a contract of 30 days on thecondition that he will receive Rs. 120 for each day he works and he will be fined Rs. 10 for each day he is absent. If he receives Rs. 2300 in all, for how many days did he remain absent?

Solution:

Given that total number of days in contract = 30.
Money, received per day for working = Rs 120
Money deducted per day for being absent= Rs 10
And Amount received by employee as salary= Rs 2300

Let the absent days of employee be x days.
Then, the employee worked for (30 – x) days.

According to the question-
120 (30 – x) – 10x = 2300
3600 – 120 x – 10x = 2300
- 130x = - 3600 + 2300
- 130x = - 1300
x = 10

Hence, the employee was absent for 10 days.

106. Kusum buys some chocolates at the rate of Rs. 10 per chocolate. She also buys an equal number of candies at the rate of Rs. 5 per candy. She makes a 20% profit on chocolates and 8% profit on candies. At the end of the day, all chocolates and candies are sold out and her profit is Rs. 240. Find the number of chocolates purchased.

Solution:

Let x chocolates be purchased by Kusum.
So,
Total cost of chocolates= 10x.
Similarly, she purchased x candies.
Then,
Total cost of candies= Rs 5x.
According to the question,

Profit on chocolates= 20% of 10x
= 2x
And,
Profit on candies= 8% of 5x
= 0.4x
Therefore, total profit= 2x + 0.4x
= Rs 2.4x
But as the given profit is Rs 240, so,
2.4x = 240
x =100
Hence, chocolates purchased by Kusum were 100.

107. A steamer goes downstream and covers the distance between two ports in 5 hours while it covers the same distance upstream in 6 hours. If the speed of the stream is 1 km/hr, find the speed of the steamer in still water.

Solution:

It is given that- Speed of stream= 1 km/h
Let the speed of the steamer in still water be x km/h.
So,
The speed of steamer downstream= (x + 1) km/h
Speed of streamer upstream= (x + 1) km/h

According to the question-
Distance covered upstream = Distance covered downstream

(Speed of stream in upstream) x Time taken upstream=(Speed of stream in downstream) x Time taken downstream
(x – 1)6 = (x + 1)5
6x – 6 = 5x + 5
6x – 5x = 6 + 5
Therefore, x= 11 km/h is the speed of the steamer.

108. Distance between two places A and B is 210 km. Two cars start simultaneously from A and B in opposite direction and distance between them after 3 hours is 54 km. If speed of one car is less than that of other by 8 km/hr, find the speed of each.

Solution:

Let the speed of car starts from A be x km/h. Then, speed of car starts from B = (x + 8) km/h
Given, distance between the cars after 3 hrs= 54 km
Now,

Total distance between A and B – total distance covered by both cars in 3hrs= 54.
210 – [3x – 3(x + 8)] = 54
210 – 3x – 3x – 24= 54
-6x = -210 + 24 + 54
-6x= -210 + 78
x = 22

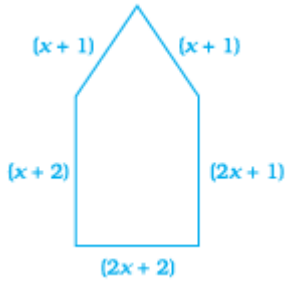
Hence, the speed of car starting from A= 22 km/h and
B= 22 + 8= 30 km/h

109. A carpenter charged Rs. 2500 for making a bed. The cost of materials used is Rs. 1100 and the labour charges are Rs. 200/hr. For how many hours did the carpenter work?

Solution:

Let, the carpenter work for x hr.
Labour charge= Rs. 200 per hr.
So,
The total charge of labour= Rs. 200x
As, for making a bed,
The carpenter charges= cost of materials + total labour charge
Therefore,
2500 = 1100 + 200x.
200x = 2500 – 1100
200x = 1400
x= 7.
Therefore, the carpenter worked for 7hrs.

110. For what value of *x* is the perimeter of shape 77 cm?

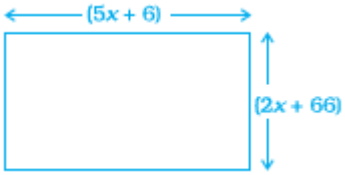


Solution:

Perimeter of shape is given as= 77cm.
Therefore, sum of all sides of the shape= 77.
(x + 1) + (x + 1) + (x + 2) + (2 x + 1) + (2 x + 2)= 77
7 x + 7= 77
7 x = 77 – 7

7 x = 70
x = 10.

111. For what value of *x* is the perimeter of shape 186 cm?



Solution:

Given,
Length of the given rectangle= (5x + 6)
Breadth of the given rectangle= (2x + 66)
Since,
Perimeter of shape= 186 cm
Therefore,
2(Length + breadth) = 186
2 [(5x + 6) + (2x + 66)] = 186
2 [7x + 72] = 186
14x + 144= 186
14x= 186 – 144
14x= 42
x= 3
Hence, the value of x= 3 cm.

112. On dividing Rs. 200 between A and B such that twice of A's share is less than 3 times B's share by 200, B's share is?

Solution:

Let shares of A be x.
Then, shares of B= (200 – x)
According to the question :
3(200 – x) – 2x= 200
600 – 3x – 2x
600 – 5x = 200
5x = 400
x = 80
Hence,
Shares of A= Rs. 80
and
Shares of B= 200 – x
= 200 – 80
= 120.

113. Madhulika thought of a number, doubled it and added 20 to it. On dividing the resulting number by 25, she gets 4. What is the number?

Solution:

Let the number be x.
According to the question:

$$\frac{2x+20}{25} = 4$$

2x + 20 = 4(25)
2x = 100 - 20
2x = 80
x = 40