Linear Equations in One Variable

Exercise 2.1

Q. 1. A. Solve the following Simple Equations:

6m = 12

Answer : Given equation: 6m = 12

$\Rightarrow m = \frac{12}{6}$ (Transposing 6 to RHS)

m = 2

∴ The solution of 6m = 12 is m = 2.

Q. 1. B. Solve the following Simple Equations:

14p = – 42

Answer : Given equation: 14p = -42

$\Rightarrow p = \frac{-42}{14}$ (Transposing 14 to RHS)

p = -3

∴ The solution of 14p = -42 is p = -3.

Q. 1. C. Solve the following Simple Equations:

– 5y = 30

Answer : Given equation: -5y = 30

$\Rightarrow y = \frac{30}{-5}$ (Transposing -5 to RHS)

y = -6

∴ The solution of -5y = 30 is y = -6.

Q. 1. D. Solve the following Simple Equations:

– 2x = – 12

Answer : Given equation: -2x = -12

$\Rightarrow x = \frac{-12}{-2}$ (Transposing -2 to RHS)

x = 6

∴ The solution of -2x = -12 is x = 6.

Q. 1. E. Solve the following Simple Equations:

34x = – 51

Answer : Given equation: 34x = -51

$\Rightarrow x = \frac{-51}{34}$ (Transposing 34 to RHS)

$x = \frac{-3}{2}$ (Dividing throughout by 17 in RHS)

∴ The solution of 34x = -51 is $x = \frac{-3}{2}$.

Q. 1. F. Solve the following Simple Equations:

$\frac{n}{7} = -3$

Answer :

Given equation: $\frac{n}{7} = -3$

$\Rightarrow$ n = -3 × 7 (Transposing 7 to RHS)

n = -21

∴ The solution of $\frac{n}{7} = -3$ is n = -21.

Q. 1. G. Solve the following Simple Equations:

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

Answer :

Given equation: $\frac{2x}{3} = 18$

$\Rightarrow 2x = 18 \times 3$ (Transposing 3 to RHS)

$2x = 54$

$\Rightarrow x = \frac{54}{2}$ (Transposing 2 to RHS)

$x = 27$

$\therefore$ The solution of $\frac{2x}{3} = 18$ is $x = 27$.

Q. 1. H. Solve the following Simple Equations:

3x + 1 = 16

Answer : Given equation: 3x + 1 = 16

$\Rightarrow$ 3x = 16 – 1 (Transposing 1 to RHS)

3x = 15

$\Rightarrow x = \frac{15}{3}$ (Transposing 3 to RHS)

x = 5

$\therefore$ The solution of 3x + 1 = 16 is x = 5.

Q. 1. I. Solve the following Simple Equations:

3p – 7 = 0

Answer : Given equation: 3p – 7 = 0

⇒ 3p = 0 + 7 (Transposing 7 to RHS)

3p = 7

⇒ p = $\frac{7}{3}$ (Transposing 3 to RHS)

∴ The solution of 3p – 7 = 0 is p = $\frac{7}{3}$.

Q. 1. J. Solve the following Simple Equations:

13 – 6n = 7

Answer : Given equation: 13 – 6n = 7

⇒ -6n = 7 – 13 (Transposing 13 to RHS)

-6n = -6

⇒ n = $\frac{-6}{-6}$ (Transposing -6 to RHS)

n = 1

∴ The solution of 13 – 6n = 7 is n = 1.

Q. 1. K. Solve the following Simple Equations:

200y – 51 = 49

Answer : Given equation: 200y – 51 = 49

⇒ 200y = 49 + 51 (Transposing 51 to RHS)

200y = 100

⇒ y = $\frac{100}{200}$ (Transposing 200 to RHS)

$y = \frac{1}{2}$

∴ The solution of 200y – 51 = 49 is $y = \frac{1}{2}$.

Q. 1. L. Solve the following Simple Equations:

11n + 1 = 1

Answer : Given equation: 11n + 1 = 1

⇒ 11n = 1 – 1 (Transposing 1 to RHS)

11n = 0

$\Rightarrow n = \frac{0}{11}$ (Transposing 11 to RHS)

n = 0

∴ The solution of 11n + 1 = 1 is n = 0.

Q. 1. M. Solve the following Simple Equations:

7x – 9 = 16

Answer : Given equation: 7x – 9 = 16

⇒ 7x = 16 + 9 (Transposing 9 to RHS)

7x = 25

$\Rightarrow x = \frac{25}{7}$ (Transposing 7 to RHS)

$\therefore$ The solution of $7x - 9 = 16$ is $x = \frac{25}{7}$.

Q. 1. N. Solve the following Simple Equations:

$8x + \frac{5}{2} = 13$

Answer : Given equation: $8x + \frac{5}{2} = 13$

⇒ 16x + 5 = 26 (Multiplying by 2 throughout)

⇒ 16x = 26 – 5 (Transposing 5 to RHS)

16x = 21

$\Rightarrow x = \frac{21}{16}$ (Transposing 16 to RHS)

$\therefore$ The solution of $8x + \frac{5}{2} = 13$ is $x = \frac{21}{16}$.

Q. 1. O. Solve the following Simple Equations:

$4x - \frac{5}{3} = 9$

Answer : Given equation: $4x - \frac{5}{3} = 9$

⇒ 12x – 5 = 27 (Multiplying by 3 throughout)

⇒ 12x = 27 + 5 (Transposing 5 to RHS)

12x = 32

$\Rightarrow x = \frac{32}{12}$ (Transposing 12 to RHS)

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

$\therefore$ The solution of $4x - \frac{5}{3} = 9$ is $x = \frac{8}{3}$.

Q. 1. P. Solve the following Simple Equations:

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

Answer :

Given equation: $x + \frac{4}{3} = 3\frac{1}{2}$

$\Rightarrow x + \frac{4}{3} = \frac{7}{2}$ $(3\frac{1}{2} = \frac{3 \times 2 + 1}{2} = \frac{7}{2})$

$\Rightarrow x = \frac{7}{2} - \frac{4}{3}$ (Transposing $\frac{4}{3}$ to RHS)

$x = \frac{7 \times 3}{2 \times 3} - \frac{4 \times 2}{3 \times 2}$

$\therefore x = \frac{21}{6} - \frac{8}{6}$

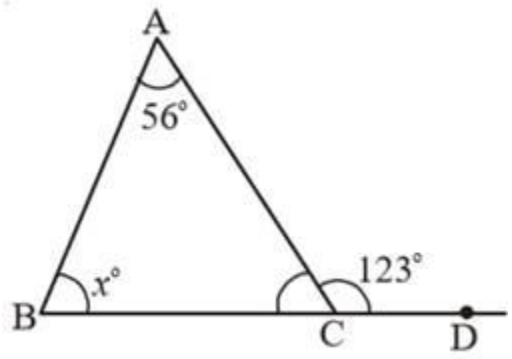
$\therefore x = \frac{21 - 8}{6}$

$\therefore x = \frac{13}{6}$

$\therefore$ The solution of $x + \frac{4}{3} = 3\frac{1}{2}$ is $x = \frac{13}{6}$.

Exercise 2.2

Q. 1. A. Find 'x' in the following figures?



Answer : Given: In Δ ABC, m∠ A = 56° and m∠ B = x°

m∠ ACD is the exterior angle of the Δ ABC.

m∠ ACD = 123°

In Δ ABC,

m∠ B + m∠ A + m∠ ACB = 180° (Sum of the measures of all angles of a triangle is 180°)

⇒ x° + 56° + m∠ ACB = 180° (1)

m∠ ACB + m∠ ACD = 180° (Linear pair of angles)

⇒ m∠ ACB + 123° = 180° (2)

From (1) and (2), we get,

x° + 56° + m∠ ACB = m∠ ACB + 123°

⇒ x° + 56° = m∠ ACB + 123° - m∠ ACB (Transposing

m∠ ACB to RHS)

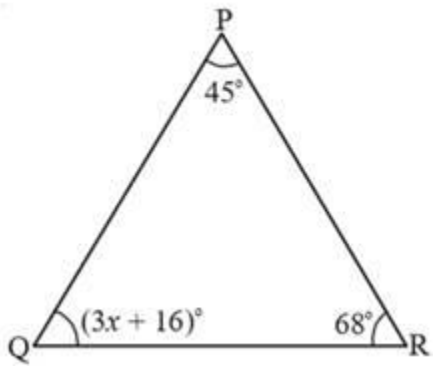
x° + 56° = 123°

⇒ x = 123 – 56 (Transposing 56 to RHS)

x = 67

∴ The value of x is 67°.

Q. 1. B. Find 'x' in the following figures?



Answer : Given: In Δ PQR, m∠ Q = (3x + 16)°, m∠ R = 68° and

m∠ P = 45°

In Δ PQR,

m∠ P + m∠ Q + m∠ R = 180° (Sum of the measures of all angles of a triangle is 180°)

⇒ 45° + (3x + 16)° + 68° = 180°

3x + 16 + 113 = 180

3x + 129 = 180

⇒ 3x = 180 – 129 (Transposing 129 to RHS)

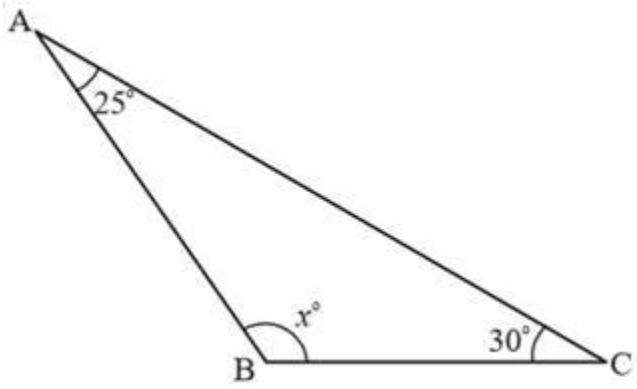
3x = 51

⇒ $x = \frac{51}{3}$ (Transposing 3 to RHS)

x = 17

∴ The value of x is 17°.

Q. 1. C. Find ‘x’ in the following figures?



Answer : Given: In Δ ABC, m∠ A = 25°, m∠ B = x° and m∠ C = 30°

In Δ ABC,

m∠ A + m∠ B + m∠ C = 180° (Sum of the measures of all angles of a triangle is 180°)

⇒ 25° + x° + 30° = 180°

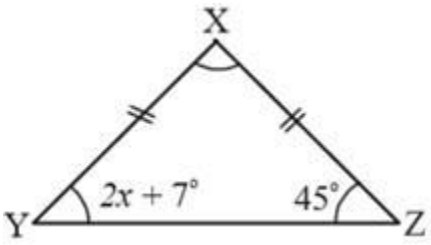
x + 55 = 180

⇒ x = 180 – 55 (Transposing 55 to RHS)

x = 125

∴ The value of x is 125°.

Q. 1. D. Find ‘x’ in the following figures?



Answer : Given: In Δ XYZ, XY ≅ XZ, m∠ Y = (2x + 7)° and m∠ Z = 45°

In Δ XYZ,

XY ≅ XZ

⇒ ∠ Y ≅ ∠ Z (Angles opposite to congruent sides of a triangle are also congruent)

⇒ m∠ Y ≅ m∠ Z

⇒ (2x + 7)° = 45°

2x + 7 = 45

⇒ 2x = 45 – 7 (Transposing 7 to RHS)

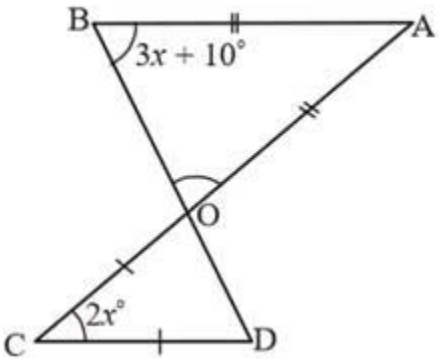
2x = 38

⇒ x = $\frac{38}{2}$ (Transposing 2 to RHS)

x = 19

∴ The value of x is 19°.

Q. 1. E. Find 'x' in the following figures?



Answer : Given: In Δ AOB, AO ≅ AB and m∠ B = (3x + 10)°

In Δ COD, CO ≅ CD and m∠ C = 2x°

In Δ AOB,

AO ≅ AB

⇒ ∠ AOB ≅ ∠ B (Angles opposite to congruent sides of a triangle are also congruent)

⇒ m∠ AOB = m∠ B

∴ m∠ AOB = (3x + 10)°

Now, ∠ AOB and ∠ COD are vertically opposite angles.

⇒ m∠ AOB = m∠ COD

∴ m∠ COD = (3x + 10)°

In Δ COD,

CO ≅ CD

⇒ ∠ COD ≅ ∠ D (Angles opposite to congruent sides of a triangle are also congruent)

⇒ m∠ COD = m∠ D

∴ m∠ D = (3x + 10)°

Now, m∠ C + m∠ COD + m∠ D = 180° (Sum of the measures of all angles of a triangle is 180°)

⇒ 2x° + (3x + 10)° + (3x + 10)° = 180°

2x + 2(3x + 10) = 180

2x + 6x + 20 = 180

8x + 20 = 180

⇒ 8x = 180 – 20 (Transposing 20 to RHS)

8x = 160

⇒ $x = \frac{160}{8}$ (Transposing 8 to RHS)

x = 20

∴ The value of x is 20°.

Q. 2. The difference between two numbers is 8. If 2 is added to the bigger number the result will be three times the smaller number. Find the numbers.

Answer : Let the smaller number be x.

The difference between the two numbers = 8.

∴ The bigger number = x + 8.

According to the given condition,

(x + 8) + 2 = 3x

⇒ x + 8 + 2 = 3x

x + 10 = 3x

⇒ 10 = 3x – x (Transposing x to RHS)

10 = 2x

⇒ $\frac{10}{2}$ = x (Transposing 2 to LHS)

5 = x

∴ x = 5

The smaller number = x = 5

The bigger number = x + 8 = 5 + 8 = 13

∴ The two numbers are 5 and 13.

Q. 3. What are those two numbers whose sum is 58 and difference is 28?

Answer : Let the smaller of the two numbers be x.

The difference between the two numbers is 28.

∴ The bigger number = x + 28.

The sum of the two numbers = 58.

According to the given condition,

x + (x + 28) = 58

⇒ x + x + 28 = 58

2x + 28 = 58

⇒ 2x = 58 – 28 (Transposing 28 to RHS)

2x = 30

$\Rightarrow x = \frac{30}{2}$ (Transposing 2 to RHS)

x = 15

The smaller of the two numbers = x = 15

The bigger of the two numbers = x + 28 = 15 + 28 = 43

∴ The two numbers are whose sum is 58 and difference is 28 are 15 and 43.

Q. 4. The sum of two consecutive odd numbers is 56. Find the numbers.

Answer : The difference between two consecutive odd numbers = 2.

Let one of the two consecutive odd numbers be x.

∴ The other odd number = x + 2.

The sum of the two numbers = 56.

According to the given condition,

x + (x + 2) = 56

⇒ x + x + 2 = 56

2x + 2 = 56

2x = 56 – 2 (Transposing 2 to RHS)

2x = 54

$\Rightarrow x = \frac{54}{2}$ (Transposing 2 to RHS)

x = 27

The first odd number = x = 27

The other odd number = x + 2 = 27 + 2 = 29

∴ The two consecutive odd numbers whose sum is 56 are 27 and 29.

Q. 5. The sum of three consecutive multiples of 7 is 777. Find these multiples.

(Hint: Three consecutive multiples of 7 are 'x', 'x + 7', 'x + 14')

Answer : Let the first of the three multiples be x.

Multiples of 7 differ from each other by 7 units.

∴ The other two multiples of 7 will be (x + 7) and (x + 14).

The sum of the three multiples of 7 = 777.

According to the given condition,

x + (x + 7) + (x + 14) = 777

⇒ x + x + 7 + x + 14 = 777

3x + 21 = 777

⇒ 3x = 777 – 21 (Transposing 21 to RHS)

3x = 756

⇒ $x = \frac{756}{3}$ (Transposing 3 to RHS)

x = 252

The three multiples of 7 are

x = 252

x + 7 = 252 + 7 = 259

x + 14 = 252 + 14 = 266

∴ The three multiples of 7 whose sum is 777 are 252, 259 and 266.

Q. 6. A man walks 10 km, then travels a certain distance by train and then by bus as far as twice by the train. If the whole journey is of 70 km, how far did he travel by train?

Answer : The distance walked by the man = 10 km.

Let the distance travelled by the train be x km.

∴ The distance travelled by bus = 2x km.

The total distance travelled by the man = 70 km.

According to the given condition,

10 + x + 2x = 70

⇒ 10 + 3x = 70

⇒ 3x = 70 – 10 (Transposing 10 to RHS)

3x = 60

⇒ $x = \frac{60}{3}$ (Transposing 3 to RHS)

x = 20

The distance travelled by train = x = 20 km.

∴ The man travelled 20 km by train.

Q. 7. Vinay bought a pizza and cut it into three pieces. When he weighed the first piece he found that it was 7g lighter than the second piece and 4g heavier than the third piece. If the whole pizza weighed 300g. How much did each of the three pieces weigh?

(Hint: weight of first piece be 'x' then weight of second piece is 'x + 7', weight of the third piece is 'x - 4')

Answer : Let the weight of the first piece of pizza be x g.

The first piece is 7g lighter than the second piece.

∴ The weight of the second piece of pizza = (x + 7) g.

The first piece is 4g heavier than the third piece.

∴ The weight of the third piece of pizza = (x – 4) g.

The total weight of the pizza = 300g.

According to the given condition,

$x + (x + 7) + (x – 4) = 300$

$\Rightarrow x + x + 7 + x – 4 = 300$

$3x + 3 = 300$

$\Rightarrow 3x = 300 – 3$ (Transposing 3 to RHS)

$3x = 297$

$\Rightarrow x = \frac{297}{3}$ (Transposing 3 to RHS)

$x = 99$

The weight of the first piece = x = 99g.

The weight of the second piece = x + 7 = 99 + 7 = 106g.

The weight of the third piece = x – 4 = 99 – 4 = 95g.

∴ The weights of the three pieces of pizza are 95g, 99g and 106g.

Q. 8. The distance around a rectangular field is 400 meters. The length of the field is 26 meters more than the breadth. Calculate the length and breadth of the field?

Answer : Let the breadth (b) of the rectangular field be x meters.

The length of the field is 26 meters more than the breadth.

∴ The length of the rectangular field = l = (x + 26) meters.

The distance around the field = 400 meters.

The distance around the field = Perimeter of the field Perimeter of rectangle = 2 (l + b)

According to the given condition,

$2 (x + 26 + x) = 400$

$\Rightarrow 2 (2x + 26) = 400$

⇒ 4x + 52 = 400 (Removing bracket)

⇒ 4x = 400 – 52 (Transposing 52 to RHS)

4x = 348

⇒ $x = \frac{348}{4}$ (Transposing 4 to RHS)

x = 87

The breadth of the field = x = 87 meters.

The length of the field = x + 26 = 87 + 26 = 113 meters.

∴ The length and breadth of the rectangular field is 113 meters and 87 meters respectively.

Q. 9. The length of a rectangular field is 8 meters less than twice its breadth. If the perimeter of the rectangular field is 56 meters, find its length and breadth?

Answer : Let the breadth (b) of the rectangular field be x meters.

∴ Twice of the breadth = 2x meters.

The length of the field is 8 meters less than twice the breadth.

∴ The length of the field = l = (2x – 8) meters.

The perimeter of the rectangular field = 56 meters.

Perimeter of rectangle = 2 (l + b)

According to the given condition,

2 (2x – 8 + x) = 56

⇒ 2 (3x – 8) = 56

6x – 16 = 56

⇒ 6x = 56 + 16 (Transposing 16 to RHS)

6x = 72

$\Rightarrow x = \frac{72}{6}$ (Transposing 6 to RHS)

x = 12

The breadth of the field = x = 12 meters.

The length of the field = 2x – 8 = 2 (12) – 8 = 24 – 8

= 16 meters.

∴ The length and breadth of the rectangular field is 16 meters and 12 meters respectively.

Q. 10. Two equal sides of a triangle are each 5 meters less than twice the third side. If the perimeter of the triangle is 55 meters, find the length of its sides?

Answer : Let the triangle be Δ ABC.

The triangle has two equal sides, i.e. AB = BC.

Let the length of the third side, ℓ (AC), be x meters. ∴ ℓ (AB) = ℓ (BC) = (2x – 5) meters.

The perimeter of Δ ABC = 55 meters.

According to the given condition,

ℓ (AB) + ℓ (BC) + ℓ (AC) = 55

⇒ 2x – 5 + 2x – 5 + x = 55

5x – 10 = 55

⇒ 5x = 55 + 10 (Transposing 10 to RHS)

5x = 65

$\Rightarrow x = \frac{65}{5}$ (Transposing 5 to RHS)

x = 13

The lengths of the sides of the triangle are

ℓ (AB) = 2x – 5 = 2 (13) – 5 = 26 – 5 = 21 meters.

ℓ (BC) = 2x – 5 = 2 (13) – 5 = 26 – 5 = 21 meters.

ℓ (AC) = x = 13 meters.

∴ The lengths of the sides of Δ ABC are 21 meters, 21 meters and 13 meters.

Q. 11. Two complementary angles differ by 12º, find the angles?

Answer : Let one of the angles be x°.

The two angles differ by 12°.

∴ The second angle = (x + 12)°.

The two angle are complementary angles.

The sum of two complementary angles is 90°.

According to the given condition,

x + x + 12 = 90

⇒ 2x + 12 = 90

⇒ 2x = 90 – 12 (Transposing 12 to RHS)

2x = 78

⇒ $x = \frac{78}{2}$ (Transposing 2 to RHS)

x = 39

The first angle = x = 39°.

The second angle = x + 12 = 39 + 12 = 51°.

∴ The two complementary angles are 39° and 51°.

Q. 12. The ages of Rahul and Laxmi are in the ratio 5:7. Four years later, the sum of their ages will be 56 years. What are their present ages?

Answer : The ratio of the ages of Rahul and Laxmi = 5:7

Let the common multiple be x.

∴ Rahul's present age = 5x years.

Laxmi's present age = 7x years.

Person	Present Age	Age after four years
Rahul	5x	5x + 4
Laxmi	7x	7x + 4

The sum of their ages four years later = 56 years.

According to the given condition,

5x + 4 + 7x + 4 = 56

⇒ 12x + 8 = 56

⇒ 12x = 56 – 8 (Transposing 8 to RHS)

12x = 48

⇒ $x = \frac{48}{12}$ (Transposing 12 to RHS)

x = 4

Rahul's present age = 5x = 5 × 4 = 20 years.

Laxmi's present age = 7x = 7 × 4 = 28 years.

∴ The present ages of Rahul and Laxmi are 20 years and 28 years respectively.

Q. 13. There are 180 multiple choice questions in a test. A candidate gets 4 marks for every correct answer, and for every un-attempted or wrongly answered questions one mark is deducted from the total score of correct answers. If a candidate scored 450 marks in the test how many questions did he answer correctly?

Answer : Number of multiple choice questions = 180

Let the number of correct answers be x.

∴ The number of wrongly answered questions = 180 – x.

The marks awarded for every correct answer = 4.

∴ The score of correct answers = 4x.

The marks deducted for every wrong answer = 1.

∴ The total marks deducted = 1 (180 – x) = 180 – x.

The total score of the candidate = 450.

According to the given condition,

4x – (180 – x) = 450

⇒ 4x – 180 + x = 450 (Removing bracket)

5x – 180 = 450

⇒ 5x = 450 + 180 (Transposing 180 to RHS)

5x = 630

⇒ $x = \frac{630}{5}$ (Transposing 5 to RHS)

x = 126

∴ The number of questions that the candidate answered correctly is 126.

Q. 14. A sum of Rs 500 is in the form of denominations of Rs 5 and Rs 10. If the total number of notes is 90 find the number of notes of each denomination.

(Hint: let the number of 5 rupee notes be 'x', then number of 10 rupee notes = 90– x)

Answer : There are a total of 90 notes of Rs 5 and Rs 10 together.

Let the number of 5 rupee notes be x.

∴ The number of 10 rupee notes = 90 – x.

The total amount = Rs 500.

According to the given condition,

5x + 10 (90 – x) = 500

⇒ 5x + 900 – 10x = 500 (Removing bracket)

-5x + 900 = 500

⇒ -5x = 500 – 900 (Transposing 900 to RHS)

-5x = -400

⇒ x = $\frac{-400}{-5}$ (Transposing -5 to RHS)

x = 80

The number of 5 rupee notes = x = 80.

The number of 10 rupee notes = 90 – x = 90 – 80 = 10

∴ The number of 5 rupee and 10 rupee notes are 80 and 10 respectively.

Exercise 2.3

Q. 1. Solve the following equation:

7x – 5 = 2x

Answer : Given equation: 7x – 5 = 2x

⇒ 7x – 2x = 5 (Transposing 2x to LHS and 5 to RHS)

5x = 5

⇒ x = $\frac{5}{5}$ (Transposing 5 to RHS)

x = 1

∴ The solution of 7x – 5 = 2x is x = 1.

Q. 2. Solve the following equation:

5x – 12 = 2x – 6

Answer : Given equation: 5x – 12 = 2x – 6

⇒ 5x – 2x = -6 + 12 (Transposing 2x to LHS and 12 to RHS)

3x = 6

$\Rightarrow x = \frac{6}{3}$ (Transposing 3 to RHS)

x = 2

∴ The solution of 5x – 12 = 2x – 6 is x = 2.

Q. 3. Solve the following equation:

7p - 3 = 3p + 8

Answer : Given equation: 7p - 3 = 3p + 8

⇒ 7p – 3p = 8 + 3 (Transposing 3p to LHS and 3 to RHS)

4p = 11

$\Rightarrow p = \frac{11}{4}$ (Transposing 4 to RHS)

∴ The solution of 7p - 3 = 3p + 8 is $p = \frac{11}{4}$.

Q. 4. Solve the following equation:

8m + 9 = 7m + 8

Answer : Given equation: 8m + 9 = 7m + 8

⇒ 8m – 7m = 8 – 9 (Transposing 7m to LHS and 9 to RHS)

m = -1

∴ The solution of 8m + 9 = 7m + 8 is m = -1.

Q. 5. Solve the following equation:

7z + 13 = 2z + 4

Answer : Given equation: 7z + 13 = 2z + 4

⇒ 7z – 2z = 4 – 13 (Transposing 2z to LHS and 13 to RHS)

6z = -9

$\Rightarrow z = \frac{-9}{6}$ (Transposing 6 to RHS)

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

$\therefore$ The solution of $7z + 13 = 2z + 4$ is $z = \frac{-3}{2}$.

Q. 6. Solve the following equation:

9y + 5 = 15y – 1

Answer : Given equation: 9y + 5 = 15y – 1

$\Rightarrow$ 9y – 15y = -5 – 1 (Transposing 15y to LHS and 5 to RHS)

-6y = -6

$\Rightarrow y = \frac{-6}{-6}$ (Transposing -6 to RHS)

y = 1.

$\therefore$ The solution of 9y + 5 = 15y – 1 is y = 1.

Q. 7. Solve the following equation:

3x + 4 = 5 (x–2)

Answer : Given equation: 3x + 4 = 5 (x–2)

$\Rightarrow$ 3x + 4 = 5x – 10 (Removing bracket)

$\Rightarrow$ 3x – 5x = -10 – 4 (Transposing 5x to LHS and 4 to RHS)

-2x = -14

$\Rightarrow x = \frac{-14}{-2}$ (Transposing -2 to RHS)

x = 7

∴ The solution of 3x + 4 = 5 (x–2) is x = 7.

Q. 8. Solve the following equation:

3 (t – 3) = 5 (2t – 1)

Answer : Given equation: 3 (t – 3) = 5 (2t – 1)

⇒ 3t – 9 = 10t – 5 (Removing brackets)

⇒ 3t – 10t = -5 + 9 (Transposing 10t to LHS and 9 to RHS)

-7t = 4

$\Rightarrow t = \frac{4}{-7}$ (Transposing -7 to RHS)

$t = -\frac{4}{7}$

$\therefore$ The solution of 3 (t – 3) = 5 (2t – 1) is $t = -\frac{4}{7}$.

Q. 9. Solve the following equation:

5 (p – 3) = 3 (p – 2)

Answer : Given equation: 5 (p – 3) = 3 (p – 2)

⇒ 5p – 15 = 3p – 6 (Removing brackets)

⇒ 5p – 3p = -6 + 15 (Transposing 3p to LHS and 15 to RHS)

2p = 9

⇒ $p = \frac{9}{2}$ (Transposing 2 to RHS)

∴ The solution of 5 (p – 3) = 3 (p – 2) is $p = \frac{9}{2}$.

Q. 10. Solve the following equation:

5 (z + 3) = 4 (2z + 1)

Answer : Given equation: 5 (z + 3) = 4 (2z + 1)

⇒ 5z + 15 = 8z + 4 (Removing brackets)

⇒ 5z – 8z = 4 – 15 (Transposing 8z to LHS and 15 to RHS)

-3z = -11

$\Rightarrow z = \frac{-11}{-3}$ (Transposing -3 to RHS)

$z = \frac{11}{3}$

$\therefore$ The solution of 5 (z + 3) = 4 (2z + 1) is $z = \frac{11}{3}$.

Q. 11. Solve the following equation:

15 (x – 1) + 4 (x + 3) = 2 (7 + x)

Answer : Given equation: 15 (x – 1) + 4 (x + 3) = 2 (7 + x)

⇒ 15x – 15 + 4x + 12 = 14 + 2x (Removing brackets)

15x + 4x – 15 + 12 = 14 + 2x

19x – 3 = 14 + 2x

⇒ 19x – 2x = 14 + 3 (Transposing 2x to LHS and 3 to RHS)

17x = 17

$\Rightarrow x = \frac{17}{17}$ (Transposing 17 to RHS)

x = 1

$\therefore$ The solution of 15 (x – 1) + 4 (x + 3) = 2 (7 + x) is

x = 1.

Q. 12. Solve the following equation:

3 (5z – 7) + 2 (9z – 11) = 4 (8z – 7) – 111

Answer : Given equation: 3 (5z – 7) + 2 (9z – 11) = 4 (8z – 7) – 111

⇒ 15z – 21 + 18z – 22 = 32z – 28 – 111 (Removing brackets)

15z + 18z – 21 – 22 = 32z – 139

33z – 43 = 32z – 139

⇒ 33z – 32z = -139 + 43 (Transposing 32z to LHS and 43 to RHS)

z = -96

∴ The solution of 3 (5z – 7) + 2 (9z – 11) = 4 (8z – 7) – 111 is z = -96.

Q. 13. Solve the following equation:

8 (x – 3) – (6 – 2x) = 2 (x + 2) – 5 (5 – x)

Answer : Given equation: 8 (x – 3) – (6 – 2x) = 2 (x + 2) – 5 (5 – x)

⇒ 8x – 24 – 6 + 2x = 2x + 4 – 25 + 5x (Removing brackets)

8x + 2x – 24 – 6 = 2x + 5x + 4 – 25

10x – 30 = 7x – 21

⇒ 10x – 7x = -21 + 30 (Transposing 7x to LHS and 30 to RHS)

3x = 9

⇒ $x = \frac{9}{3}$ (Transposing 3 to RHS)

x = 3

∴ The solution of 8 (x – 3) – (6 – 2x) = 2 (x + 2) – 5 (5 – x)

Is x = 3.

Q. 14. Solve the following equation:

3 (n – 4) + 2 (4n – 5) = 5 (n + 2) + 16

Answer : Given equation: 3 (n – 4) + 2 (4n – 5) = 5 (n + 2) + 16

⇒ 3n – 12 + 8n – 10 = 5n + 10 + 16 (Removing brackets)

3n + 8n – 12 – 10 = 5n + 26

11n – 22 = 5n + 26

⇒ 11n – 5n = 26 + 22 (Transposing 5n to LHS and 22 to RHS)

6n = 48

⇒ n = $\frac{48}{6}$ (Transposing 6 to RHS)

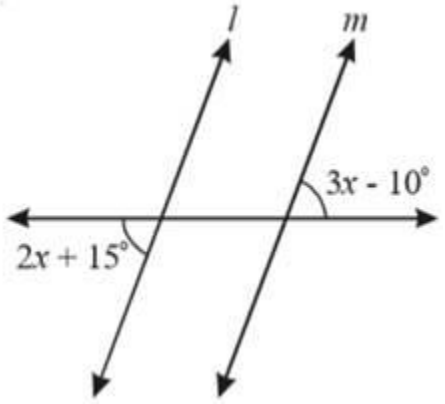
n = 8

∴ The solution of 3 (n – 4) + 2 (4n – 5) = 5 (n + 2) + 16 is

n = 8.

Exercise 2.4

Q. 1. Find the value of 'x' so that $l \| m$.



Answer : The two given angles are (2x + 15)° and (3x-10)°.

We know that vertically opposite angles are equal.

The angle which is vertically opposite to (2x + 15)° is also

Corresponding to (3x-10)°.

For l ∥ m, the corresponding angles must be equal.

∴ (2x + 15)° and (3x-10)° are both equal to the same angle.

According to the given condition,

(2x + 15)° = (3x-10)°

⇒ 2x + 15 = 3x – 10

⇒ 2x – 3x = -10 – 15 (Transposing 3x to LHS and 15 to RHS)

-x = -25

∴ x = 25 (Multiplying by -1 throughout)

∴ The value of x so that l ∥ m is 25°.

Q. 2. Eight times of a number reduced by 10 is equal to the sum of six times the number and 4.Find the number.

Answer : Let the number be x.

Eight times of the number reduced by 10 = 8x – 10.

Sum of six times the number and 4 = 6x + 4.

According to the given condition,

8x – 10 = 6x + 4

⇒ 8x – 6x = 4 + 10 (Transposing 6x to LHS and 10 to RHS)

2x = 14

⇒ $x = \frac{14}{2}$ (Transposing 2 to RHS)

x = 7

∴ The required number is 7.

Q. 3. A number consists of two digits whose sum is 9. If 27 is subtracted from the number its digits are reversed. Find the number.

Answer : Let the digit in the units place of the number be x.

The sum of the digits of the number = 9.

∴ The digit in the tens place of the number = 9 – x.

∴ The number = 10 (9 – x) + x

The number whose digits are a reverse of the given number

= 10x + (9 – x).

According to the given condition,

10 (9 – x) + x – 27 = 10x + (9 – x)

⇒ 90 – 10x + x – 27 = 10x + 9 – x (Removing brackets)

-9x + 63 = 9x + 9

⇒ -9x – 9x = 9 – 63 (Transposing 9x to LHS and 63 to RHS)

-18x = -54

⇒ $x = \frac{-54}{-18}$ (Transposing -18 to RHS)

x = 3

The digit in the units place of the number = x = 3

The digit in the tens place of the number = 9 – x = 9 – 3

= 6

∴ The number is 63.

Q. 4. A number is divided into two parts such that one part is 10 more than the other. If the two parts are in the ratio 5:3, find the number and the two parts.

Answer : A number is divided into two parts.

The two parts are in the ratio 5:3.

Let the common multiple be x.

The two parts will then be 5x and 3x.

One part is 10 more than the other part.

According to the given condition,

5x = 3x + 10

⇒ 5x – 3x = 10 (Transposing 3x to LHS)

2x = 10

⇒ $x = \frac{10}{2}$ (Transposing 2 to RHS)

x = 5

The two parts of the number are

3x = 3 × 5 = 15

5x = 5 × 5 = 25

The number = 15 + 25 = 40

∴ The number is 40 and its two parts are 15 and 25.

Q. 5. When I triple a certain number and add 2, I get the same answer as I do when I subtract the number from 50. Find the number.

Answer : Let the number be x.

Triple the number = 3x.

The number subtracted from 50 = 50 – x.

According to the given condition,

3x + 2 = 50 – x

⇒ 3x + x = 50 – 2 (Transposing x to LHS and 2 to RHS)

4x = 48

⇒ $x = \frac{48}{4}$ (Transposing 4 to RHS)

x = 12

∴ The required number is 12.

Q. 6. Mary is twice older than her sister. In 5years time, she will be 2 years older than her sister. Find how old are they both now.

Answer : Let the present age of Mary's sister be x years.

Mary is twice older than her sister.

∴ Mary's present age = 2x years.

Person	Present Age	Age after five years
Mary	2x	2x + 5
Mary's sister	x	x + 5

According to the given condition,

2x + 5 = x + 5 + 2

2x + 5 = x + 7

⇒ 2x – x = 7 – 5 (Transposing x to LHS and 5 to RHS)

x = 2

The present age of Mary's sister = x = 2 years.

Mary's present age = 2x = 2 × 2 = 4 years.

∴ The present ages of Mary and her sister are 4 years and 2 years respectively.

Q. 7. In 5 years' time, Reshma will be three times old as she was 9 years ago. How old is she now?

Answer : Let Reshma's present age be x years.

Age 9 years ago	Present age	Age after 5 years
x – 9	x	x + 5

According to the given condition,

x + 5 = 3 (x – 9)

x + 5 = 3x – 27 (Removing bracket)

⇒ x – 3x = -27 – 5 (Transposing 3x to LHS and 5 to RHS)

-2x = -32

⇒ x = $\frac{-32}{-2}$ (Transposing -2 to RHS)

x = 16

∴ Reshma's present age is 16 years.

Q. 8. A town's population increased by 1200 people, and then this new population decreased 11%. The town now had 32 less people than it did before the 1200 increase. Find the original population.

Answer : Let the original population of the town be x.

The population increased by 1200.

∴ The new population of the town = x + 1200.

The new population decreased by 11%.

New quantity after decrease = $\left(1-\frac{d}{100}\right)a$

where d = decrease percent and a = original quantity.

∴ The final population of the town = $\left(1-\frac{11}{100}\right)(x+1200)$

According to the given condition,

$$\left(1-\frac{11}{100}\right)(x+1200) = x-32$$

$$\frac{89}{100}(x+1200) = x-32$$

⇒ 89 (x + 1200) = 100 (x – 32) (Multiply by 100 on both sides)

⇒ 89x + 106800 = 100x – 3200 (Removing brackets)

⇒ 89x – 100x = -3200 – 106800 (Transposing 100x to LHS and 106800 to RHS)

-11x = -110000

⇒ $x = \frac{-110000}{-11}$ (Transposing -11 to RHS)

x = 10000

∴ The original population of the town was 10,000.

Exercise 2.5

Q. 1. A. Solve the following equation.

$$\frac{n}{5} - \frac{5}{7} = \frac{2}{3}$$

Answer :

Given equation: $\frac{n}{5} - \frac{5}{7} = \frac{2}{3}$

$\Rightarrow \frac{n}{5} = \frac{2}{3} + \frac{5}{7}$ (Transposing $\frac{5}{7}$ to RHS)

$\frac{n}{5} = \frac{14 + 15}{21}$ (LCM of 3 and 7 is 21)

$$\frac{n}{5} = \frac{29}{21}$$

$\Rightarrow \frac{n}{5} \times 5 = \frac{29}{21} \times 5$ (Multiplying by 5 on both sides)

$n = \frac{145}{21}$

$\therefore$ The solution of the given equation is $n = \frac{145}{21}$.

Q. 1. B. Solve the following equation.

$$\frac{x}{3} - \frac{x}{4} = 14$$

Answer :

Given equation: $\frac{x}{3} - \frac{x}{4} = 14$

$\Rightarrow \frac{4x-3x}{12} = 14$ (LCM of 3 and 4 is 12)

$\frac{x}{12} = 14$

$\Rightarrow x = 12 \times 14$ (Transposing 12 to RHS)

$x = 168$

$\therefore$ The solution of the given equation is $x = 168$.

Q. 1. C. Solve the following equation.

$$\frac{z}{2} + \frac{z}{3} - \frac{z}{6} = 8$$

Answer :

Given equation: $\frac{z}{2} + \frac{z}{3} - \frac{z}{6} = 8$

$\Rightarrow \frac{3z + 2z - z}{6} = 8$ (LCM of 2, 3 and 6 is 6)

$\frac{4z}{6} = 8$

$\Rightarrow 4z = 8 \times 6$ (Transposing 6 to RHS)

$4z = 48$

$\Rightarrow z = \frac{48}{4}$ (Transposing 4 to RHS)

$z = 12$

∴ The solution of the given equation is z = 12.

Q. 1. D. Solve the following equation.

$$\frac{2p}{3} - \frac{p}{5} = 11\frac{2}{3}$$

Answer :

Given equation: $\frac{2p}{3} - \frac{p}{5} = 11\frac{2}{3}$

$\frac{2p}{3} - \frac{p}{5} = \frac{35}{3}$ (Convert mixed fraction into improper fraction)

$\Rightarrow \frac{10p-3p}{15} = \frac{35}{3}$ (LCM of 3 and 5 is 15)

$\Rightarrow \frac{7p}{15} \times 15 = \frac{35}{3} \times 15$ (Multiplying by 15 on both sides)

$7p = 175$

$\Rightarrow p = \frac{175}{7}$ (Transposing 7 to RHS)

$P = 25$

∴ The solution of the given equation is p = 25.

Q. 1. E. Solve the following equation.

$$9\frac{1}{4} = y - 1\frac{1}{3}$$

Answer :

Given equation: $9\frac{1}{4} = y - 1\frac{1}{3}$

$\frac{37}{4} = y - \frac{4}{3}$ (Convert mixed fraction into improper fraction)

$\Rightarrow \frac{37}{4} + \frac{4}{3} = y$ (Transposing $\frac{4}{3}$ to RHS)

$\Rightarrow \frac{111+16}{12} = y$ (LCM of 3 and 4 is 12)

$y = \frac{127}{12}$

$\therefore$ The solution of the given equation is $y = \frac{127}{12}$.

Q. 1. F. Solve the following equation.

$$\frac{x}{2} - \frac{4}{5} + \frac{x}{5} + \frac{3x}{10} = \frac{1}{5}$$

Answer :

Given equation: $\frac{x}{2} - \frac{4}{5} + \frac{x}{5} + \frac{3x}{10} = \frac{1}{5}$

$\Rightarrow \frac{x}{2} + \frac{x}{5} + \frac{3x}{10} = \frac{1}{5} + \frac{4}{5}$ (Transposing $\frac{4}{5}$ to RHS)

$\Rightarrow \frac{5x+2x+3x}{10} = \frac{4+1}{5}$ (LCM of 2, 5 and 10 is 10)

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

$\therefore x = 1$

$\therefore$ The solution of the given equation is $x = 1$.

Q. 1. G. Solve the following equation.

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

Answer :

Given equation: $\frac{x}{2} - \frac{1}{4} = \frac{x}{3} + \frac{1}{2}$

$\Rightarrow \frac{x}{2} - \frac{x}{3} = \frac{1}{2} + \frac{1}{4}$ (Transposing $\frac{x}{3}$ to LHS and $\frac{1}{4}$ to RHS)

$\frac{3x-2x}{6} = \frac{2+1}{4}$ (LCM of 2 and 3 is 6 and of 2 and 4 is 4)

$$\frac{x}{6} = \frac{3}{4}$$

$\Rightarrow \frac{x}{6} \times 6 = \frac{3}{4} \times 6$ (Multiplying by 6 on both sides)

$x = \frac{9}{2}$

$\therefore$ The solution of the given equation is $x = \frac{9}{2}$.

Q. 1. H. Solve the following equation.

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

Answer :

Given equation: $\frac{2x-3}{3x+2} = \frac{-2}{3}$

Multiplying (3x + 2) and 3 on both sides, we get

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

3 (2x – 3) = -2 (3x + 2)

⇒ 6x – 9 = -6x – 4 (Removing brackets)

⇒ 6x + 6x = –4 + 9 (Transposing 6x to LHS and 9 to RHS)

12x = 5

⇒ x = $\frac{5}{12}$ (Transposing 12 to RHS)

∴ The solution of the given equation is x = $\frac{5}{12}$.

Q. 1. I. Solve the following equation.

$$\frac{8p-5}{7p+1} = \frac{-2}{4}$$

Answer :

Given equation: $\frac{8p-5}{7p+1} = \frac{-2}{4}$

Multiplying (7p + 1) and 4 on both sides, we get

$$\frac{8p-5}{7p+1} \times (7p+1) \times 4 = \frac{-2}{4} \times (7p+1) \times 4$$

4 (8p – 5) = -2 (7p + 1)

⇒ 32p – 20 = -14p – 2 (Removing brackets)

⇒ 32p + 14p = -2 + 20 (Transposing 32p to LHS and 20 to RHS)

46p = 18

⇒ p = $\frac{18}{46}$ (Transposing 46 to RHS)

p = $\frac{9}{23}$

∴ The solution of the given equation is p = $\frac{9}{23}$.

Q. 1. J. Solve the following equation.

$$\frac{7y + 2}{5} = \frac{6y - 5}{11}$$

Answer :

Given equation: $\frac{7y+2}{5} = \frac{6y-5}{11}$

LCM of 5 and 11 is 55.

$\Rightarrow \frac{7y+2}{5} \times 55 = \frac{6y-5}{11} \times 55$ (Multiplying by 55 on both sides)

11 (7y + 2) = 5 (6y – 5)

⇒ 77y + 22 = 30y – 25 (Removing brackets)

⇒ 77y – 30y = -25 – 22 (Transposing 30y to LHS and 22 to RHS)

47y = -47

⇒ y = $\frac{-47}{47}$ (Transposing 47 to RHS)

y = -1

∴ The solution of the given equation is y = -1.

Q. 1. K. Solve the following equation.

$$\frac{x + 5}{6} - \frac{x + 1}{9} = \frac{x + 3}{4}$$

Answer :

Given equation: $\frac{x+5}{6} - \frac{x+1}{9} = \frac{x+3}{4}$

$\Rightarrow \frac{3(x+5)-2(x+1)}{18} = \frac{x+3}{4}$ (LCM of 6 and 9 is 18)

$$\frac{3x + 15 - 2x - 2}{18} = \frac{x + 3}{4}$$

$$\frac{x + 13}{18} = \frac{x + 3}{4}$$

LCM of 4 and 18 is 36.

$\frac{x+13}{18} \times 36 = \frac{x+3}{4} \times 36$ (Multiplying by 36 on both sides)

2 (x + 13) = 9 (x + 3)

⇒ 2x + 26 = 9x + 27 (Removing brackets)

⇒ 2x – 9x = 27 – 26 (Transposing 9x to LHS and 26 to RHS)

-7x = 1

⇒ x = $\frac{1}{-7}$ (Transposing -7 to RHS)

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

∴ The solution of the given equation is x = $-\frac{1}{7}$.

Q. 1. L. Solve the following equation.

$$\frac{3t + 1}{16} - \frac{2t - 3}{7} = \frac{t + 3}{8} + \frac{3t - 1}{14}$$

Answer :

Given equation: $\frac{3t+1}{16} - \frac{2t-3}{7} = \frac{t+3}{8} + \frac{3t-1}{14}$

$\Rightarrow \frac{3t+1}{16} - \frac{t+3}{8} = \frac{3t-1}{14} + \frac{2t-3}{7}$ (Transposing $\frac{t+3}{8}$ to LHS and $\frac{2t-3}{7}$ to RHS)

$\Rightarrow \frac{3t+1-2(t+3)}{16} = \frac{3t-1+2(2t-3)}{14}$ (LCM of 8 and 16 is 16; of 7 and 14 is 14)

$$\frac{3t + 1 - 2t - 6}{16} = \frac{3t - 1 + 4t - 6}{14}$$

$$\frac{t-5}{16} = \frac{7t-7}{14}$$

$\Rightarrow \frac{t-5}{16} = \frac{7(t-1)}{14}$ (Taking out 7 common in numerator of RHS)

$$\frac{t-5}{16} = \frac{t-1}{2}$$

LCM of 2 and 16 is 16.

$\frac{t-5}{16} \times 16 = \frac{t-1}{2} \times 16$ (Multiplying by 16 on both sides)

$t - 5 = 8\,(t - 1)$

$\Rightarrow t - 5 = 8t - 8$ (Removing bracket)

$\Rightarrow t - 8t = -8 + 5$ (Transposing 8t to LHS and 5 to RHS)

$-7t = -3$

$\Rightarrow t = \frac{-3}{-7}$ (Transposing -7 to RHS)

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

∴ The solution of the given equation is $t = \frac{3}{7}$.

Q. 2. What number is that of which the third part exceeds the fifth part by 4?

Answer : Let the number be x.

The third part of the number = $\frac{X}{3}$

The fifth part of the number = $\frac{X}{5}$

According to the given condition,

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

$$\Rightarrow \frac{x}{3} - \frac{x}{5} = 4 \text{ (Transposing } \frac{x}{5} \text{ to LHS)}$$

$$\frac{5x-3x}{15} = 4 \text{ (LCM of 3 and 5 is 15)}$$

$$\frac{2x}{15} = 4$$

⇒ 2x = 15 × 4 (Transposing 15 to RHS)

2x = 60

⇒ x = $\frac{60}{2}$ (Transposing 2 to LHS)

x = 30

∴ The number is 30.

Q. 3. The difference between two positive integers is 36. The quotient when one integer is divided by other is 4. Find the integers.

(Hint: If one number is 'x', then the other number is 'x – 36')

Answer : Let one of the integers be x.

The difference between the two integers is 36.

∴ The other integer = x – 36.

According to the given condition,

$$\frac{x}{x-36} = 4$$

⇒ x = 4 (x – 36) (Transposing x – 36 to RHS)

x = 4x – 144 (Removing bracket)

⇒ x – 4x = -144 (Transposing 4x to LHS)

-3x = -144

⇒ x = $\frac{-144}{-3}$ (Transposing – 3 to RHS)

x = 48

The two integers are

x = 48

x – 36 = 48 – 36 = 12

∴ The two positive integers are 12 and 48.

Q. 4. The numerator of a fraction is 4 less than the denominator. If 1 is added to both its numerator and denominator, it becomes $\frac{1}{2}$. Find the fraction.

Answer : Let the denominator of the fraction be x.

The numerator is 4 less than the denominator.

∴ The numerator = x – 4.

According to the given condition,

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

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

$$\Rightarrow \frac{x-3}{x+1}\times(x+1)=\frac{1}{2}\times(x+1) \text{ (Multiplying by x + 1 on both sides)}$$

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

$2x - 6 = x + 1$

$\Rightarrow 2x - x = 1 + 6$ (Transposing x to LHS and 6 to RHS)

$x = 7$

The numerator of the fraction = $x - 4 = 7 - 4 = 3$

The denominator of the fraction = $x = 7$

$\therefore$ The fraction is $\frac{3}{7}$.

Q. 5. Find three consecutive numbers such that if they are divided by 10, 17, and 26 respectively, the sum of their quotients will be 10.

(Hint: Let the consecutive numbers = x, x + 1, x + 2, then
$$\frac{x}{10}+\frac{x+1}{17}+\frac{x+2}{26}=10)$$

Answer :

Let the three consecutive numbers be x, x + 1 and x + 2.

The quotient when

x is divided by 10 = $\frac{x}{10}$

x + 1 is divided by 17 = $\frac{x+1}{17}$

x + 2 is divided by 26 = $\frac{x+2}{26}$

The sum of the quotients = 10.

According to the given condition,

$$\frac{x}{10} + \frac{x + 1}{17} + \frac{x + 2}{26} = 10$$

$$\Rightarrow \frac{221x + 130(x + 1) + 85(x + 2)}{2210} = 10 \text{ (LCM of 10, 17 and 26 is 2210)}$$

$$\frac{221x + 130x + 130 + 85x + 170}{2210} = 10$$

$$\frac{436x + 300}{2210} = 10$$

$\Rightarrow \frac{436x + 300}{2210} \times 2210 = 10 \times 2210$ (Multiply by 2210 on both sides)

$436x + 300 = 22100$

$\Rightarrow 436x = 22100 - 300$ (Transposing 300 to RHS)

$436x = 21800$

$\Rightarrow x = \frac{21800}{436}$ (Transposing 436 to RHS)

$x = 50$

The three consecutive numbers are

$x = 50$

The three consecutive numbers are

x = 50

x + 1 = 50 + 1 = 51

x + 2 = 50 + 2 = 52

∴ The three consecutive numbers are 50, 51 and 52.

Q. 6. In class of 40 pupils the number of girls is three-fifths of the number of boys. Find the number of boys in the class.

Answer : Let the number of boys in the class be x.

∴ The number of girls in the class = $\frac{3x}{5}$.

The total number of pupils in the class = 40.

According to the given condition,

$$\frac{3x}{5} + x = 40$$

⇒ 3x + 5x = 200 (Multiplying throughout by 5)

8x = 200

⇒ $x = \frac{200}{8}$ (Transposing 8 to RHS)

x = 25

∴ The number of boys in the class is 25.

Q. 7. After 15 years, Mary's age will be four times of her present age. Find her present age.

Answer : Let Mary's present age be x years.

Her age after 15 years = (x + 15) years.

According to the given condition,

4x = x + 15

⇒ 4x – x = 15 (Transposing x to LHS)

3x = 15

⇒ $x = \frac{15}{3}$ (Transposing 3 to RHS)

x = 5

Q. 8. Arvind has a kiddy bank. It is full of one-rupee and fifty paise coins. It contains 3 times as many fifty paise coins as one rupee coins. The total amount of the money in the bank is` 35. How many coins of each kind are there in the bank?

Answer : Let the number of one-rupee coins be x.

∴ The total amount in one-rupee coins = Rs x.

The number of fifty paise coins = 3x.

We know that one rupee = 100 paise.

∴ The total amount in fifty paise coins = $\frac{3x \times 50}{100}$

= Rs $\frac{3x}{2}$.

According to the given condition,

x + $\frac{3x}{2}$ = 35

⇒ 2x + 3x = 70 (Multiplying by 2 throughout)

5x = 70

⇒ x = $\frac{70}{5}$ (Transposing 5 to RHS)

x = 14

The number of one-rupee coins = x = 14.

The number of fifty paise coins = 3x = 3 × 14 = 42.

∴ The number of one-rupee coins and fifty paise coins in the bank are 14 and 42 respectively.

Q. 9. A and B together can finish a piece of work in 12 days. If 'A' alone can finish the same work in 20 days, in how many days B alone can finish it?

Answer : Let the number of days taken by B to finish the work be x.

Number of days taken by A to finish the work = 20.

Number of days taken by A and B together = 12.

According to the given condition,

$$\frac{1}{20} + \frac{1}{x} = \frac{1}{12}$$

$\Rightarrow \frac{1}{x} = \frac{1}{12} - \frac{1}{20}$ (Transposing $\frac{1}{20}$ to RHS)

$\frac{1}{x} = \frac{5-3}{60}$ (LCM of 12 and 20 is 60)

$$\frac{1}{x} = \frac{2}{60} = \frac{1}{30}$$

⇒ x = 30

∴ B alone can finish the work in 30 days.

Q. 10. If a train runs at 40 kmph it reaches its destination late by 11 minutes. But if it runs at 50 kmph it is late by 5 minutes only. Find the distance to be covered by the train.

Answer : Let the distance covered by the train be x km.

Time delay when speed is 40 kmph = 11 minutes.

Time delay when speed is 50 kmph = 5 minutes.

The difference in time for different speeds = 11 – 5

= 6 minutes.

$= \frac{6}{60} = \frac{1}{10}$ hours.

We know that, speed $= \frac{\text{distance}}{\text{time}}$

$\therefore$ Time $= \frac{\text{distance}}{\text{speed}}$

According to the given condition,

$$\frac{x}{40} - \frac{x}{50} = \frac{1}{10}$$

$\Rightarrow \frac{5x-4x}{200} = \frac{1}{10}$ (LCM of 40 and 50 is 200)

$$\frac{x}{200} = \frac{1}{10}$$

$\Rightarrow \frac{x}{200} \times 200 = \frac{1}{10} \times 200$ (Multiplying by 200 on both sides)

$\Rightarrow x = 20$

$\therefore$ The distance to be covered by the train is 20 km.

Q. 11. One fourth of a herd of deer has gone to the forest. One third of the total number is grazing in a field and remaining 15 are drinking water on the bank of a river. Find the total number of deer.

Answer : Let the total number of deer in the herd be x.

One fourth of the herd is in the forest.

∴ The number of deer in the forest = $\frac{x}{4}$.

One third of the herd is grazing in a field.

∴ The number of deer grazing in the field = $\frac{x}{3}$.

Number of deer drinking water = 15.

According to the given condition,

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

$$\Rightarrow \frac{3x + 4x}{12} = x - 15 \text{ (Transposing 15 to RHS and LCM of 3 and 4 is 12)}$$

$$\Rightarrow \frac{7x}{12} = x - 15$$

$$\frac{7x}{12} \times 12 = (x - 15) \times 12 \text{ (Multiplying by 12 on both sides)}$$

⇒ 7x = 12x – 180 (Removing bracket)

⇒ 7x – 12x = -180 (Transposing 12x to LHS)

-5x = -180

⇒ x = $\frac{-180}{-5}$ (Transposing -5 to RHS)

x = 36

∴ The total number of deer in the herd is 36.

Q. 12. By selling a radio for `903, a shop keeper gains 5%. Find the cost price of the radio.

Answer : Let the cost price (CP) of the radio be Rs x.

The selling price of the radio = SP = Rs 903.

Gain percent = 5%.

$$\text{Gain percent} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100$$

According to the given condition,

$$5 = \frac{903 - x}{x} \times 100$$

⇒ 5x = 100 (903 – x) (Transposing x to LHS)

⇒ 5x = 90300 – 100x (Removing bracket)

⇒ 5x + 100x = 90300 (Transposing 100x to LHS)

105x = 90300

⇒ x = $\frac{90300}{105}$ (Transposing 105 to RHS)

x = 860

∴ The cost price of the radio is Rs 860.

Q. 13. Sekhar gives a quarter of his sweets to Renu and then gives 5 sweets to Raji. He has 7 sweets left. How many did he have to start with?

Answer : Let the total number of sweets with Sekhar be x.

He gave a quarter to Renu.

∴ Number of sweets given to Renu = $\frac{X}{4}$.

Number of sweets given to Raji = 5.

Number of sweets left = 7.

According to the given condition,

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

$$\Rightarrow \frac{x}{4} + 12 = x$$

$$\Rightarrow \frac{x}{4} - x = -12$$ (Transposing x to LHS and 12 to RHS)

$$\frac{x-4x}{4} = -12$$ (LCM of 1 and 4 is 4)

$$-\frac{3x}{4} = -12$$

$$\Rightarrow -3x = -12 \times 4$$ (Transposing 4 to RHS)

$$-3x = -48$$

$$\Rightarrow x = \frac{-48}{-3}$$ (Transposing -3 to RHS)

x = 16

∴ The number of sweets that Sekhar had at the start is 16.