

CBSE NCERT Solutions for Class 7 Mathematics Chapter 4

Back of Chapter Questions

Exercise 4.1

1. Complete the last column of the table.

S. No.	Equation	Value	Say, whether the equation is satisfied. (Yes/No)
(i)	$x + 3 = 0$	$x = 3$	
(ii)	$x + 3 = 0$	$x = 0$	
(iii)	$x + 3 = 0$	$x = -3$	
(iv)	$x - 7 = 1$	$x = 7$	
(v)	$x - 7 = 1$	$x = 8$	
(vi)	$5x = 25$	$x = 0$	
(vii)	$5x = 25$	$x = 5$	
(viii)	$5x = 25$	$x = -5$	
(ix)	$\frac{m}{3} = 2$	$m = -6$	
(x)	$\frac{m}{3} = 2$	$m = 0$	
(xi)	$\frac{m}{3} = 2$	$m = 6$	

Solution:

(i) Given: $x + 3 = 0$

L.H.S. = $x + 3$

By substituting $x = 3$

L.H.S. = $3 + 3 = 6$

But, R.H.S. = 0

Since, L.H.S. \neq R.H.S.

\therefore No, the equation is not satisfied.

(ii) Given: $x + 3 = 0$

L.H.S. = $x + 3$

By substituting $x = 0$

$$\text{L.H.S.} = 0 + 3 = 3$$

$$\text{But R.H.S.} = 0$$

Since, $\text{L.H.S} \neq \text{R.H.S.}$

\therefore No, the equation is not satisfied.

(iii) Given: $x + 3 = 0$

$$\text{L.H.S.} = x + 3$$

By substituting $x = -3$

$$\text{L.H.S.} = -3 + 3 = 0$$

$$\text{R.H.S.} = 0$$

Since, $\text{L.H.S} = \text{R.H.S.}$

\therefore Yes, the equation is satisfied.

(iv) Given: $x - 7 = 1$

$$\text{L.H.S.} = x - 7$$

By substituting $x = 7$

$$\text{L.H.S.} = 7 - 7 = 0$$

$$\text{But R.H.S.} = 1$$

Since, $\text{L.H.S} \neq \text{R.H.S.}$

\therefore No, the equation is not satisfied.

(v) Given: $x - 7 = 1$

$$\text{L.H.S.} = x - 7$$

By substituting $x = 8$

$$\text{L.H.S.} = 8 - 7 = 1$$

$$\text{R.H.S.} = 1$$

Since, $\text{L.H.S} = \text{R.H.S.}$

\therefore Yes, the equation is satisfied.

(vi) Given: $5x = 25$

$$\text{L.H.S.} = 5x$$

By substituting $x = 0$

$$\text{L.H.S.} = 5 \times 0 = 0$$

But R.H.S = 25

Since, L.H.S \neq R.H.S.

\therefore No, the equation is not satisfied.

(vii) Given: $5x = 25$

L.H.S. = $5x$

By substituting $x = 5$

L.H.S. = $5 \times 5 = 25$

R.H.S = 25

Since, L.H.S = R.H.S.

\therefore Yes, the equation is satisfied.

(viii) Given: $5x = 25$

L.H.S. = $5x$

By substituting $x = -5$

L.H.S. = $5 \times (-5) = -25$

But R.H.S = 25

Since, L.H.S \neq R.H.S.

\therefore No, the equation is not satisfied.

(ix) Given: $\frac{m}{3} = 2$

L.H.S. = $\frac{m}{3}$

By substituting $m = -6$

L. H. S. = $\frac{-6}{3} = -2$

But R.H.S = 2

Since, L.H.S \neq R.H.S.

\therefore No, the equation is not satisfied.

(x) Given: $\frac{m}{3} = 2$

L.H.S. = $\frac{m}{3}$

By substituting $m = 0$

L.H.S. = $\frac{0}{3} = 0$

But R.H.S = 2

Since, L.H.S \neq R.H.S.

\therefore No, the equation is not satisfied.

(xi) Given: $\frac{m}{3} = 2$

L.H.S. = $\frac{m}{3}$

By substituting $m = 6$

L.H.S. = $\frac{6}{3} = 2$

R.H.S = 2

Since, L.H.S = R.H.S.

\therefore Yes, the equation is satisfied.

2. Check whether the value given in the brackets is a Solution to the given equation or not:

(a) $n + 5 = 19$ ($n = 1$)

(b) $7n + 5 = 19$ ($n = -2$)

(c) $7n + 5 = 19$ ($n = 2$)

(d) $4p - 3 = 13$ ($p = 1$)

(e) $4p - 3 = 13$ ($p = -4$)

(f) $4p - 3 = 13$ ($p = 0$)

Solution:

(a) Given: $n + 5 = 19$ ($n = 1$)

Substituting $n = 1$ in L.H.S. = $n + 5$

$\Rightarrow n + 5 = 1 + 5 = 6$

But R.H.S = 19

As L.H.S. \neq R.H.S.,

Therefore, $n = 1$ is not a Solution of the given equation, $n + 5 = 19$.

(b) Given: $7n + 5 = 19$ ($n = -2$)

Substituting $n = -2$ in L.H.S. = $7n + 5$

$\Rightarrow 7n + 5 = 7 \times (-2) + 5 = -14 + 5 = -9$

But R.H.S = 19

As L.H.S. \neq R.H.S.,

Therefore, $n = -2$ is not a Solution of the given equation, $7n + 5 = 19$.

(c) Given: $7n + 5 = 19$ ($n = 2$)

Substituting $n = 2$ in L.H.S. = $7n + 5$

$$\Rightarrow 7n + 5 = 7 \times (2) + 5 = 14 + 5$$

R.H.S = 19

As L.H.S. = R.H.S.,

Therefore, $n = 2$ is a Solution of the given equation, $7n + 5 = 19$.

(d) Given: $4p - 3 = 13$ ($p = 1$)

Substituting $p = 1$ in L.H.S. = $4p - 3$

$$\Rightarrow 4p - 3 = (4 \times 1) - 3 = 1$$

But R.H.S = 13

As L.H.S \neq R.H.S.,

Therefore, $p = 1$ is not a Solution of the given equation, $4p - 3 = 13$.

(e) Given: $4p - 3 = 13$ ($p = -4$)

Substituting $p = -4$ in L.H.S. = $4p - 3$

$$\Rightarrow 4p - 3 = 4 \times (-4) - 3 = -16 - 3 = -19$$

But R.H.S = 13

As L.H.S. \neq R.H.S.,

Therefore, $p = -4$ is not a Solution of the given equation, $4p - 3 = 13$.

(f) Given: $4p - 3 = 13$ ($p = 0$)

Substituting $p = 0$ in L.H.S. = $4p - 3$

$$\Rightarrow 4p - 3 = (4 \times 0) - 3 = -3$$

But R.H.S = 13

As L.H.S. \neq R.H.S.,

Therefore, $p = 0$ is not a Solution of the given equation, $4p - 3 = 13$.

3. Solve the following equations by trial and error method:

(i) $5p + 2 = 17$ (ii) $3m - 14 = 4$

Solution:

Given: $5p + 2 = 17$

R.H.S. = 17

Substituting $p = 1$ in L.H.S.,

$$\Rightarrow (5 \times 1) + 2 = 7 \neq \text{R.H.S.}$$

Substituting $p = 2$ in L.H.S.,

$$\Rightarrow (5 \times 2) + 2 = 10 + 2 = 12 \neq \text{R.H.S.}$$

Substituting $p = 3$ in L.H.S.,

$$\Rightarrow (5 \times 3) + 2 = 17 = \text{R.H.S.}$$

Hence, as L.H.S = R.H.S. for $p = 3$, it is a Solution of the given equation.

Given: $3m - 14 = 4$

R.H.S = 4

Substituting $m = 4$,

$$\Rightarrow (3 \times 4) - 14 = -2 \neq \text{R.H.S.}$$

Substituting $m = 5$,

$$\Rightarrow (3 \times 5) - 14 = 1 \neq \text{R.H.S.}$$

Substituting $m = 6$,

$$\Rightarrow (3 \times 6) - 14 = 18 - 14 = 4 = \text{R.H.S.}$$

Hence, as L.H.S = R.H.S for $m = 6$, it is a Solution of the given equation.**4. Write equations for the following statements:**

- (i) The sum of numbers x and 4 is 9.
- (ii) 2 subtracted from y is 8.
- (iii) Ten times a is 70.
- (iv) The number b divided by 5 gives 6.
- (v) Three-fourth of t is 15.
- (vi) Seven times m plus 7 gets you 77.
- (vii) One-fourth of a number x minus 4 gives 4.
- (viii) If you take away 6 from 6 times y , you get 60.
- (ix) If you add 3 to one-third of z , you get 30.

Solution:

We can obtain the equations by understanding the statements given.

- (i) The sum of number x and 4 is $x + 4$. Its sum is equal to 9.
Hence, the equation is $x + 4 = 9$.
- (ii) When 2 is subtracted from y we get, $y - 2$, which is equal to 8.
Hence, the equation is $y - 2 = 8$.
- (iii) 10 times a is equal to $10a$, which is equal to 70.
Hence, the equation is $10a = 70$.
- (iv) When, b is divided by 5, we get $\frac{b}{5}$, which is equal to 6.
Hence, the equation is $\frac{b}{5} = 6$.
- (v) Three-fourth of t is $\frac{3}{4}t$, which is equal to 15.
Hence, the equation is $\frac{3}{4}t = 15$.
- (vi) Seven times of m is nothing but $7m$. When we add 7 to it, we get $7m + 7$, which is equal to 77.
Hence, the equation is $7m + 7 = 77$.
- (vii) One-fourth of a number x is $\frac{x}{4}$. When we subtract 4 to it, we get $\frac{x}{4} - 4$, which is equal to 4.
Hence, the equation is $\frac{x}{4} - 4 = 4$.
- (viii) Six times of y is $6y$. When we take away 6 from $6y$, we get $6y - 6$, which is equal to 60.
Hence, the equation is $6y - 6 = 60$.
- (ix) One-third of z is $\frac{z}{3}$. When we add 3 to it, we get $\frac{z}{3} + 3$, which is equal to 30.
Hence, the equation is $\frac{z}{3} + 3 = 30$.

5. Write the following equations in statement forms:

- (i) $p + 4 = 15$
(ii) $m - 7 = 3$
(iii) $2m = 7$

(iv) $\frac{m}{5} = 3$

(v) $\frac{3m}{5} = 6$

(vi) $3p + 4 = 25$

(vii) $4p - 2 = 18$

(viii) $\frac{p}{2} + 2 = 8$

Solution:

- (i) The sum of numbers p and 4 is 15.
- (ii) 7 subtracted from m is 3.
- (iii) Two times of a number m is 7.
- (iv) One-fifth of a number m is 3.
- (v) Three-fifth of a number m is 6.
- (vi) Thrice of a number p , when added to 4, gives 25.
- (vii) 2 subtracted from four times of a number p , is 18.
- (viii) Half of a number p , added with 2, gives 8.

6. Set up an equation in the following cases:

- (i) Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. (Take m to be the number of Parmit's marbles.)
- (ii) Laxmi's father is 49 years old. He is 4 years older than three times Laxmi's age. (Take Laxmi's age to be y years.)
- (iii) The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. (Take the lowest score to be l .)
- (iv) In an isosceles triangle, the vertex angle is twice either base angle. (Let the base angle be b in degrees. Remember that the sum of angles of a triangle is 180 degrees).

Solution:

- (i) Let Parmit have m marbles.

It is given that,

$5 \times$ Number of marbles Parmit has $+ 7 =$ Number of marbles Irfan has

$$\Rightarrow 5 \times m + 7 = 37$$

$$\Rightarrow 5m + 7 = 37$$

- (ii) Let us assume Laxmi to be y years old.

It is given that,

$$3 \times \text{Laxmi's age} + 4 = \text{Laxmi's father's age}$$

$$\Rightarrow 3 \times y + 4 = 49$$

$$\Rightarrow 3y + 4 = 49$$

- (iii) Let us assume the lowest marks to be l .

It is given that,

$$2 \times \text{Lowest marks} + 7 = \text{Highest marks}$$

$$\Rightarrow 2 \times l + 7 = 87$$

$$\Rightarrow 2l + 7 = 87$$

- (iv) We know that, an isosceles triangle has two of its angles of equal measure.

Let base angle be b .

$$\text{Vertex angle} = 2 \times \text{Base angle} = 2b$$

$$\text{Sum of all interior angles of a triangle} = 180^\circ$$

$$\Rightarrow b + b + 2b = 180^\circ$$

$$\Rightarrow 4b = 180^\circ$$

Exercise 4.2

7. Give first the step you will use to separate the variable and then Solve the equation:

(a) $x - 1 = 0$

(b) $x + 1 = 0$

(c) $x - 1 = 5$

(d) $x + 6 = 2$

(e) $y - 4 = -7$

(f) $y - 4 = 4$

(g) $y + 4 = 4$

(h) $y + 4 = -4$

Solution:

(a) Given: $x - 1 = 0$

First Step: Adding 1 to both sides of the given equation, we obtain:

$$\Rightarrow x - 1 + 1 = 0 + 1$$

$$\Rightarrow x = 1$$

(b) Given: $x + 1 = 0$

First Step: Subtracting 1 from both sides of the given equation, we obtain:

$$\Rightarrow x + 1 - 1 = 0 - 1$$

$$\Rightarrow x = -1$$

(c) Given: $x - 1 = 5$

First Step: Adding 1 to both sides of the given equation, we obtain:

$$\Rightarrow x - 1 + 1 = 5 + 1$$

$$\Rightarrow x = 6$$

(d) Given: $x + 6 = 2$

First Step: Subtracting 6 from both sides of the given equation, we obtain:

$$\Rightarrow x + 6 - 6 = 2 - 6$$

$$\Rightarrow x = -4$$

(e) Given: $y - 4 = -7$

First Step: Adding 4 to both sides of the given equation, we obtain:

$$\Rightarrow y - 4 + 4 = -7 + 4$$

$$\Rightarrow y = -3$$

(f) Given: $y - 4 = 4$

First Step: Adding 4 to both sides of the given equation, we obtain:

$$\Rightarrow y - 4 + 4 = 4 + 4$$

$$\Rightarrow y = 8$$

(g) Given: $y + 4 = 4$

First Step: Subtracting 4 from both sides of the given equation, we obtain:

$$\Rightarrow y + 4 - 4 = 4 - 4$$

$$\Rightarrow y = 0$$

(h) Given: $y + 4 = -4$

First Step: Subtracting 4 from both sides of the given equation, we obtain:

$$\Rightarrow y + 4 - 4 = -4 - 4$$

$$\Rightarrow y = -8$$

8. Give first the step you will use to separate the variable and then Solve the equation:

(a) $3l = 42$

(b) $\frac{b}{2} = 6$

(c) $\frac{p}{7} = 4$

(d) $4x = 25$

(e) $8y = 36$

(f) $\frac{z}{3} = \frac{5}{4}$

(g) $\frac{a}{5} = \frac{7}{15}$

(h) $20t = -10$

Solution:

(a) Given: $3l = 42$

On dividing both sides of the given equation by 3, we obtain:

$$\Rightarrow \frac{3l}{3} = \frac{42}{3}$$

$$\Rightarrow l = 14$$

(b) Given: $\frac{b}{2} = 6$

On multiplying both sides of the given equation by 2, we obtain:

$$\Rightarrow \frac{b \times 2}{2} = 6 \times 2$$

$$\Rightarrow b = 12$$

(c) Given: $\frac{p}{7} = 4$

Multiplying both sides of the given equation by 7, we obtain

$$\Rightarrow \frac{p \times 7}{7} = 4 \times 7$$

$$\Rightarrow p = 28$$

(d) Given: $4x = 25$

Dividing both sides of the given equation by 4, we obtain

$$\Rightarrow \frac{4x}{4} = \frac{25}{4}$$

$$\Rightarrow x = \frac{25}{4}$$

(e) Given: $8y = 36$

Dividing both sides of the given equation by 8, we obtain

$$\Rightarrow \frac{8y}{8} = \frac{36}{8}$$

$$\Rightarrow y = \frac{9}{2}$$

(f) Given: $\frac{z}{3} = \frac{5}{4}$

Multiplying both sides of the given equation by 3, we obtain

$$\Rightarrow \frac{z \times 3}{3} = \frac{5 \times 3}{4}$$

$$\Rightarrow z = \frac{15}{4}$$

(g) Given: $\frac{a}{5} = \frac{7}{15}$

Multiplying both sides of the given equation by 5, we obtain

$$\Rightarrow \frac{a \times 5}{5} = \frac{7 \times 5}{15}$$

$$\Rightarrow a = \frac{7}{3}$$

(h) Given: $20t = -10$

Dividing both sides of the given equation by 20, we obtain

$$\Rightarrow \frac{20t}{20} = \frac{-10}{20}$$

$$\Rightarrow t = \frac{-1}{2}$$

9. Give the steps you will use to separate the variable and then Solve the equation:

(a) $3n - 2 = 46$

(b) $5m + 7 = 17$

(c) $\frac{20p}{3} = 40$

(d) $\frac{3p}{10} = 6$

Solution:

(a) Given: $3n - 2 = 46$

on adding 2 to both sides of the given equation, we obtain:

$$\Rightarrow 3n - 2 + 2 = 46 + 2$$

$$\Rightarrow 3n = 48$$

Dividing both sides of the given equation by 3, we obtain

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

$$\Rightarrow n = 16$$

(b) Given: $5m + 7 = 17$

On subtracting 7 from both sides of the given equation, we obtain:

$$\Rightarrow 5m + 7 - 7 = 17 - 7$$

$$\Rightarrow 5m = 10$$

Dividing both sides of the given equation by 5, we obtain

$$\Rightarrow \frac{5m}{5} = \frac{10}{5}$$

$$\Rightarrow m = 2$$

(c) Given: $\frac{20p}{3} = 40$

On multiplying both sides of the given equation by 3, we obtain:

$$\Rightarrow \frac{20p \times 3}{3} = 40 \times 3$$

$$\Rightarrow 20p = 120$$

On dividing both sides of the given equation by 20, we obtain:

$$\Rightarrow \frac{20p}{20} = \frac{120}{20}$$

$$\Rightarrow p = 6$$

(d) Given: $\frac{3p}{10} = 6$

On multiplying both sides of the given equation by 10, we obtain:

$$\Rightarrow \frac{3p \times 10}{10} = 6 \times 10$$

$$\Rightarrow 3p = 60$$

On dividing both sides of the given equation by 3, we obtain

$$\Rightarrow \frac{3p}{3} = \frac{60}{3}$$

$$\Rightarrow p = 20$$

10. Solve the following equations:

(a) $10p = 100$

(b) $10p + 10 = 100$

(c) $\frac{p}{4} = 5$

(d) $\frac{-p}{3} = 5$

(e) $\frac{3p}{4} = 6$

(f) $3s = -9$

(g) $3s + 12 = 0$

(h) $3s = 0$

(i) $2q = 6$

(j) $2q - 6 = 0$

(k) $2q + 6 = 0$

(l) $2q + 6 = 12$

Solution:

(a) Given: $10p = 100$

$$\Rightarrow \frac{10p}{10} = \frac{100}{10}$$

$$\Rightarrow p = 10$$

(b) Given: $10p + 10 = 100$

$$\Rightarrow 10p + 10 - 10 = 100 - 10$$

$$\Rightarrow 10p = 90$$

$$\Rightarrow \frac{10p}{10} = \frac{90}{10}$$

$$\Rightarrow p = 9$$

(c) Given: $\frac{p}{4} = 5$

$$\Rightarrow \frac{p \times 4}{4} = 5 \times 4$$

$$\Rightarrow p = 20$$

(d) Given: $\frac{-p}{3} = 5$

$$\Rightarrow \frac{-p \times 3}{3} = 5 \times 3$$

$$\Rightarrow -p = 15$$

$$\Rightarrow -p \times (-1) = 15 \times (-1)$$

$$\Rightarrow p = -15$$

(e) Given: $\frac{3p}{4} = 6$

$$\Rightarrow \frac{3p \times 4}{4} = 6 \times 4$$

$$\Rightarrow 3p = 24$$

$$\Rightarrow \frac{3p}{3} = \frac{24}{3}$$

$$\Rightarrow p = 8$$

(f) Given: $3s = -9$

$$\Rightarrow \frac{3s}{3} = \frac{-9}{3}$$

$$\Rightarrow s = -3$$

(g) Given: $3s + 12 = 0$

$$\Rightarrow 3s + 12 - 12 = 0 - 12$$

$$\Rightarrow 3s = -12$$

$$\Rightarrow \frac{3s}{3} = \frac{-12}{3}$$

$$\Rightarrow s = -4$$

(h) Given: $3s = 0$

$$\Rightarrow \frac{3s}{3} = \frac{0}{3}$$

$$\Rightarrow s = 0$$

(i) Given: $2q = 6$

$$\Rightarrow \frac{2q}{2} = \frac{6}{2}$$

$$\Rightarrow q = 3$$

(j) Given: $2q - 6 = 0$

$$\Rightarrow 2q - 6 + 6 = 0 + 6$$

$$\Rightarrow 2q = 6$$

$$\Rightarrow \frac{2q}{2} = \frac{6}{2}$$

$$\Rightarrow q = 3$$

(k) Given: $2q + 6 = 0$

$$\Rightarrow 2q + 6 - 6 = 0 - 6$$

$$\Rightarrow 2q = -6$$

$$\Rightarrow \frac{2q}{2} = \frac{-6}{2}$$

$$\Rightarrow q = -3$$

(l) Given: $2q + 6 = 12$

$$\Rightarrow 2q + 6 - 6 = 12 - 6$$

$$\Rightarrow 2q = 6$$

$$\Rightarrow \frac{2q}{2} = \frac{6}{2}$$

$$\Rightarrow q = 3$$

Exercise 4.3

11. Solve the following equations.

(a) $2y + \frac{5}{2} = \frac{37}{2}$

(b) $5t + 28 = 10$

(c) $\frac{a}{5} + 3 = 2$

(d) $\frac{q}{4} + 7 = 5$

(e) $\frac{5}{2}x = -5$

- (f) $\frac{5}{2}x = \frac{25}{4}$
 (g) $7m + \frac{19}{2} = 13$
 (h) $6z + 10 = -2$
 (i) $\frac{3l}{2} = \frac{2}{3}$
 (j) $\frac{2b}{3} - 5 = 3$

Solution:

- (a) Given: $2y + \frac{5}{2} = \frac{37}{2}$
 $\Rightarrow 2y = \frac{37}{2} - \frac{5}{2} = \frac{32}{2} = 16$ (Transposing $\frac{5}{2}$ to R.H.S.)
 On dividing both sides by 2,
 $\Rightarrow y = \frac{16}{2} = 8$
- (b) Given: $5t + 28 = 10$
 $\Rightarrow 5t = 10 - 28 = -18$ (Transposing 28 to R.H.S.)
 On dividing both sides by 5,
 $\Rightarrow t = \frac{-18}{5}$
- (c) Given: $\frac{a}{5} + 3 = 2$
 $\Rightarrow \frac{a}{5} = 2 - 3 = -1$ (Transposing 3 to R.H.S.)
 On multiplying both sides by 5,
 $\Rightarrow a = -1 \times 5 = -5$
- (d) Given: $\frac{q}{4} + 7 = 5$
 $\Rightarrow \frac{q}{4} = 5 - 7 = -2$ (Transposing 7 to R.H.S.)
 On multiplying both sides by 4,
 $\Rightarrow q = -8$
- (e) Given: $\frac{5}{2}x = -5$
 On multiplying both sides by 2,
 $\Rightarrow 5x = -5 \times 2 = -10$

On dividing both sides by 5,

$$\Rightarrow x = \frac{-10}{5} = -2$$

(f) Given: $\frac{5}{2}x = \frac{25}{4}$

On multiplying both sides by 2,

$$\Rightarrow 5x = \frac{25}{4} \times 2 = \frac{25}{2}$$

On dividing both sides by 5,

$$\Rightarrow x = \frac{25}{2} \times \frac{1}{5}$$

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

(g) Given: $7m + \frac{19}{2} = 13$

$$\Rightarrow 7m = 13 - \frac{19}{2} = \frac{26-19}{2} \text{ (Transposing } \frac{19}{2} \text{ to R.H.S.)}$$

$$\Rightarrow 7m = \frac{7}{2}$$

On dividing both sides by 7,

$$\Rightarrow m = \frac{7}{2} \times \frac{1}{7}$$

$$\Rightarrow m = \frac{1}{2}$$

(h) Given: $6z + 10 = -2$

$$\Rightarrow 6z = -2 - 10 = -12 \text{ (Transposing 10 to R.H.S.)}$$

On dividing both sides by 6,

$$\Rightarrow z = \frac{-12}{6} = -2$$

(i) Given: $\frac{3l}{2} = \frac{2}{3}$

On multiplying both sides by 2,

$$\Rightarrow 3l = \frac{2}{3} \times 2 = \frac{4}{3}$$

On dividing both sides by 3,

$$\Rightarrow l = \frac{4}{3} \times \frac{1}{3} = \frac{4}{9}$$

(j) Given: $\frac{2b}{3} - 5 = 3$

$$\Rightarrow \frac{2b}{3} = 3 + 5 = 8 \text{ (Transposing } -5 \text{ to R.H.S.)}$$

On multiplying both sides by 3,

$$\Rightarrow 2b = 8 \times 3 = 24$$

On dividing both sides by 2,

$$\Rightarrow b = \frac{24}{2} = 12$$

12. Solve the following equations.

(a) $2(x + 4) = 12$

(b) $3(n - 5) = 21$

(c) $3(n - 5) = -21$

(d) $-4(2 + x) = 8$

(e) $4(2 - x) = 8$

Solution:

(a) Given: $2(x + 4) = 12$

On dividing both sides by 2,

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

$$\Rightarrow x = 6 - 4 = 2 \text{ (Transposing 4 to R.H.S.)}$$

(b) Given: $3(n - 5) = 21$

On dividing both sides by 3,

$$\Rightarrow n - 5 = \frac{21}{3} = 7$$

$$\Rightarrow n = 7 + 5 = 12 \text{ (Transposing } -5 \text{ to R.H.S.)}$$

(c) Given: $3(n - 5) = -21$

On dividing both sides by 3,

$$\Rightarrow n - 5 = \frac{-21}{3} = -7$$

$$\Rightarrow n = -7 + 5 = -2 \text{ (Transposing } -5 \text{ to R.H.S.)}$$

(d) Given: $-4(2 + x) = 8$

On dividing both sides by -4 ,

$$\Rightarrow 2 + x = \frac{8}{-4} = -2$$

$$\Rightarrow x = -2 - 2 = -4 \text{ (Transposing } 2 \text{ to R.H.S.)}$$

(e) Given: $4(2 - x) = 8$

On dividing both sides by 4 ,

$$\Rightarrow 2 - x = \frac{8}{4} = 2$$

$$\Rightarrow -x = 2 - 2 \text{ (Transposing } 2 \text{ to R.H.S.)}$$

$$\Rightarrow -x = 0$$

$$\Rightarrow x = 0$$

13. Solve the following equations:

(a) $4 = 5(p - 2)$

(b) $-4 = 5(p - 2)$

(c) $16 = 4 + 3(t + 2)$

(d) $4 + 5(p - 1) = 34$

(e) $0 = 16 + 4(m - 6)$

Solution:

(a) Given: $4 = 5(p - 2)$

On dividing both sides by 5 ,

$$\Rightarrow \frac{4}{5} = p - 2$$

$$\Rightarrow \frac{4}{5} + 2 = p \text{ (Transposing } -2 \text{ to L.H.S.)}$$

$$\Rightarrow \frac{4 + 10}{5} = p$$

$$\Rightarrow \frac{14}{5} = p$$

$$\Rightarrow p = \frac{14}{5}$$

(b) Given: $-4 = 5(p - 2)$

On dividing both sides by 5,

$$\Rightarrow -\frac{4}{5} = p - 2$$

$$\Rightarrow -\frac{4}{5} + 2 = p \text{ (Transposing } -2 \text{ to L.H.S.)}$$

$$\Rightarrow \frac{-4 + 10}{5} = p$$

$$\Rightarrow \frac{6}{5} = p$$

$$\Rightarrow p = \frac{6}{5}$$

(c) Given: $16 = 4 + 3(t + 2)$

$$\Rightarrow 16 - 4 = 3(t + 2) \text{ (Transposing 4 to L.H.S.)}$$

$$\Rightarrow 12 = 3(t + 2)$$

Dividing both sides by 3,

$$\Rightarrow \frac{12}{3} = t + 2$$

$$\Rightarrow 4 = t + 2$$

$$\Rightarrow 4 - 2 = t \text{ (Transposing 2 to L.H.S.)}$$

$$\Rightarrow 2 = t$$

$$\Rightarrow t = 2$$

(d) Given: $4 + 5(p - 1) = 34$

$$\Rightarrow 5(p - 1) = 34 - 4 = 30 \text{ (Transposing 4 to R.H.S.)}$$

Dividing both sides by 5,

$$\Rightarrow p - 1 = \frac{30}{5} = 6$$

$$\Rightarrow p = 6 + 1 = 7 \text{ (Transposing } -1 \text{ to R.H.S.)}$$

(e) Given: $0 = 16 + 4(m - 6)$

$$\Rightarrow 0 = 16 + 4m - 24$$

$$\Rightarrow 0 = -8 + 4m$$

$$\Rightarrow 0 + 8 = 4m \text{ (Transposing } -8 \text{ to L.H.S.)}$$

$$\Rightarrow 8 = 4m$$

Dividing both sides by 4,

$$\Rightarrow \frac{8}{4} = m$$

$$\Rightarrow 2 = m$$

$$\Rightarrow m = 2$$

13. (a) Construct 3 equations starting with $x = 2$
 (b) Construct 3 equations starting with $x = -2$

Solution:

(a) $x = 2$

On multiplying both sides by 5, we get:

$$\Rightarrow 5x = 10 \dots(i)$$

On subtracting 3 from both sides,

$$\Rightarrow 5x - 3 = 10 - 3$$

$$\Rightarrow 5x - 3 = 7 \dots(ii)$$

On dividing both sides by 2,

$$\Rightarrow \frac{5x}{2} - \frac{3}{2} = \frac{7}{2} \dots(iii)$$

(b) $x = -2$

On subtracting 2 from both sides,

$$\Rightarrow x - 2 = -2 - 2$$

$$\Rightarrow x - 2 = -4 \dots(i)$$

Again, $x = -2$

On multiplying by 6,

$$\Rightarrow 6 \times x = -2 \times 6$$

$$\Rightarrow 6x = -12$$

On subtracting 12 from both sides,

$$\Rightarrow 6x - 12 = -12 - 12$$

$$\Rightarrow 6x - 12 = -24 \dots(ii)$$

On adding 24 to both sides,

$$\Rightarrow 6x - 12 + 24 = -24 + 24$$

$$\Rightarrow 6x + 12 = 0 \dots(\text{iii})$$

Exercise 4.4:

14. Set up equations and solve them to find the unknown numbers in the following cases:

- (a) Add 4 to eight times a number; you get 60.
- (b) One-fifth of a number minus 4 gives 3.
- (c) If I take three-fourths of a number and add 3 to it, I get 21.
- (d) When I subtracted 11 from twice a number, the result was 15.
- (e) Munna subtracts thrice the number of notebooks he has from 50, he finds the result to be 8.
- (f) Ibenhal thinks of a number. If she adds 19 to it and divides the sum by 5, she will get 8.
- (g) Anwar thinks of a number. If he takes away 7 from $\frac{5}{2}$ of the number, the result is 23.

Solution:

(a) Let us consider the number to be x .

$$8 \text{ times of this number} = 8x$$

Hence, the equation is,

$$8x + 4 = 60$$

$$\Rightarrow 8x = 60 - 4 \text{ (Transposing 4 to R.H.S.)}$$

$$\Rightarrow 8x = 56$$

On dividing both sides by 8,

$$\Rightarrow \frac{8x}{8} = \frac{56}{8}$$

$$\Rightarrow x = 7$$

(b) Let us consider the number to be x .

$$\text{One-fifth of this number} = \frac{x}{5}$$

Hence, the equation is,

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

$$\Rightarrow \frac{x}{5} = 3 + 4 \text{ (Transposing } -4 \text{ to R.H.S.)}$$

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

On multiplying both sides by 5,

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

$$\Rightarrow x = 35$$

(c) Let us consider the number to be x .

$$\text{Three-fourth of this number} = \frac{3x}{4}$$

Hence, the equation is,

$$\frac{3x}{4} + 3 = 21$$

$$\Rightarrow \frac{3x}{4} = 21 - 3 = 18 \text{ (Transposing 3 to R.H.S.)}$$

On multiplying both sides by 4,

$$\Rightarrow \frac{3x \times 4}{4} = 18 \times 4$$

$$\Rightarrow 3x = 72$$

On dividing both sides by 3,

$$\Rightarrow \frac{3x}{3} = \frac{72}{3}$$

$$\Rightarrow x = 24$$

(d) Let us consider the number to be x .

$$\text{Twice of this number} = 2x$$

Hence, the equation is,

$$2x - 11 = 15$$

$$\Rightarrow 2x = 15 + 11 \text{ (Transposing } -11 \text{ to R.H.S.)}$$

$$\Rightarrow 2x = 26$$

On dividing both sides by 2,

$$\Rightarrow \frac{2x}{2} = \frac{26}{2}$$

$$\Rightarrow x = 13$$

- (e) Let us consider the number to be x .

Thrice the number of books = $3x$

Hence, the equation is,

$$50 - 3x = 8$$

$$\Rightarrow -3x = 8 - 50 \text{ (Transposing 50 to R.H.S.)}$$

$$\Rightarrow -3x = -42$$

On dividing both sides by -3 ,

$$\Rightarrow \frac{-3x}{-3} = \frac{-42}{-3}$$

$$\Rightarrow x = 14$$

- (f) Let us consider the number to be x .

Hence, the equation is,

$$\frac{x + 19}{5} = 8$$

On multiplying both sides by 5,

$$\Rightarrow \frac{(x + 19) \times 5}{5} = 8 \times 5$$

$$\Rightarrow x + 19 = 40$$

$$\Rightarrow x = 40 - 19 \text{ (Transposing 19 to R.H.S.)}$$

$$\Rightarrow x = 21$$

- (g) Let us consider the number to be x .

$$\Rightarrow \frac{5}{2} \text{ of this number} = \frac{5x}{2}$$

Hence, the equation is,

$$\frac{5x}{2} - 7 = 23$$

$$\Rightarrow \frac{5x}{2} = 23 + 7 \text{ (Transposing } -7 \text{ to R.H.S.)}$$

$$\Rightarrow \frac{5x}{2} = 30$$

On multiplying both sides by 2,

$$\Rightarrow \frac{5x \times 2}{2} = 30 \times 2$$

$$\Rightarrow 5x = 60$$

On dividing both sides by 5,

$$\Rightarrow \frac{5x}{5} = \frac{60}{5}$$

$$\Rightarrow x = 12$$

15. Solve the following:

- (a) The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. What is the lowest score?
- (b) In an isosceles triangle, the base angles are equal. The vertex angle is 40° . What are the base angles of the triangle? (Remember, the sum of three angles of a triangle is 180°).
- (c) Sachin scored twice as many runs as Rahul. Together, their runs fell two short of a double century. How many runs did each one score?

Solution:

- (a) Let us consider the lowest score to be l .

$$2 \times \text{Lowest marks} + 7 = \text{Highest marks}$$

$$\Rightarrow 2l + 7 = 87$$

$$\Rightarrow 2l = 87 - 7 \text{ (Transposing 7 to R.H.S.)}$$

$$\Rightarrow 2l = 80$$

On dividing both sides by 2,

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

$$\Rightarrow l = 40$$

Therefore, the lowest score is 40.

- (b) Let us consider the base angles to be equal to b .

We are aware that the sum of all interior angles of a triangle is 180° .

$$\Rightarrow b + b + 40^\circ = 180^\circ$$

$$\Rightarrow 2b + 40^\circ = 180^\circ$$

$$\Rightarrow 2b = 180^\circ - 40^\circ = 140^\circ \text{ (Transposing } 40^\circ \text{ to R.H.S.)}$$

On dividing both sides by 2,

$$\Rightarrow \frac{2b}{2} = \frac{140^\circ}{2}$$

$$\Rightarrow b = 70^\circ$$

Therefore, the base angles of the triangle are of 70° measure.

- (c) Let us consider Rahul's score to be x .

Therefore, Sachin's score = $2x$

Rahul's score + Sachin's score = $200 - 2$

$$\Rightarrow x + 2x = 198$$

$$\Rightarrow 3x = 198$$

On dividing both sides by 3,

$$\Rightarrow \frac{3x}{3} = \frac{198}{3}$$

$$\Rightarrow x = 66$$

So, Rahul's score = 66 and,

Sachin's score = $2 \times 66 = 132$

16. Solve the following:

- (i) Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. How many marbles does Parmit have?
- (ii) Laxmi's father is 49 year old. He is 4 years older than three times Laxmi's age. What is Laxmi's age?
- (iii) People of Sundargram planted trees in the village garden. Some of the trees were fruit trees. The number of non-fruit trees were two more than three times the number of fruit trees. What was the number of fruit trees planted if the number of non-fruit trees planted was 77?

Solution:

- (i) Let us consider Parmit's marbles to be equal x .

5 times the number of marbles that Parmit has = $5x$

$$\Rightarrow 5x + 7 = 37$$

$$\Rightarrow 5x = 37 - 7 = 30 \text{ (Transposing 7 to R.H.S.)}$$

On dividing both sides by 5,

$$\Rightarrow \frac{5x}{5} = \frac{30}{5}$$

$$\Rightarrow x = 6$$

Therefore, Parmit has 6 marbles.

- (ii) Let us consider Laxmi's age to be x years.

$$3 \times \text{Laxmi's age} + 4 = \text{Her father's age}$$

$$\Rightarrow 3x + 4 = 49$$

$$\Rightarrow 3x = 49 - 4 \text{ (Transposing 4 to R.H.S.)}$$

$$\Rightarrow 3x = 45$$

On dividing both sides by 3,

$$\Rightarrow \frac{3x}{3} = \frac{45}{3}$$

$$\Rightarrow x = 15$$

Therefore, Laxmi's age is 15 years.

- (iii) Let the number of fruit trees be x .

$$3 \times \text{Number of fruit trees} + 2 = \text{Number of non-fruit trees}$$

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

$$\Rightarrow 3x = 77 - 2 \text{ (Transposing 2 to R.H.S.)}$$

$$\Rightarrow 3x = 75$$

On dividing both sides of the equation by 3,

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

$$\Rightarrow x = 25$$

Therefore, the number of fruit trees was 25.

17. Solve the following riddle:

I am a number,

Tell my identity!

Take me seven times over

And add a fifty!

To reach a triple century

You still need forty!

Solution:

Let us consider the number to be x .

Hence, the equation is,

$$(7x + 50) + 40 = 300$$

$$\Rightarrow 7x + 90 = 300$$

$$\Rightarrow 7x = 300 - 90 \text{ (Transposing 90 to R.H.S.)}$$

$$\Rightarrow 7x = 210$$

On dividing both sides by 7,

$$\Rightarrow \frac{7x}{7} = \frac{210}{7}$$

$$\Rightarrow x = 30$$

Therefore, the number is 30.

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