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 $x = 0$

L.H.S. $= 0 + 3 = 3$

But R.H.S. $= 0$

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

$\therefore$ No, the equation is not satisfied.

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

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

By substituting $x = -3$

L.H.S. $= -3 + 3 = 0$

R.H.S $= 0$

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

$\therefore$ Yes, the equation is satisfied.

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

L.H.S. $= x - 7$

By substituting $x = 7$

L.H.S. $= 7 - 7 = 0$

But R.H.S = 1

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

$\therefore$ No, the equation is not satisfied.

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

L.H.S. $= x - 7$

By substituting $x = 8$

L.H.S. $= 8 - 7 = 1$

R.H.S = 1

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

$\therefore$ Yes, the equation is satisfied.

(vi) Given: $5x = 25$

L.H.S. $= 5x$

By substituting $x = 0$

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.,

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

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

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

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

$\Rightarrow (5 \times 3) + 2 = 17 =$ 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 $m = 4$,

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

Substituting $m = 5$,

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

Substituting $m = 6$,

$\Rightarrow (3 \times 6) - 14 = 18 - 14 = 4 =$ 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 × 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,

$3 \times$ Laxmi's age $+ 4 =$ 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,

$2 \times$ Lowest marks $+ 7 =$ 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.

Vertex angle $= 2 \times$ Base angle $= 2b$

Sum of all interior angles of a triangle $= 180°$

$\Rightarrow b + b + 2b = 180°$

$\Rightarrow 4b = 180°$

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: $7m + \frac{19}{2} = 13$

$\Rightarrow 7m = 13 - \frac{19}{2} = \frac{26-19}{2}$ (Transposing $\frac{19}{2}$ 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: $6z + 10 = -2$

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

On dividing both sides by 6,

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

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

$\Rightarrow \frac{2b}{3} = 3 + 5 = 8$ (Transposing -5 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,

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

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

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

On dividing both sides by 3,

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

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

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

On dividing both sides by 3,

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

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

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

On dividing both sides by -4,

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

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

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

On dividing both sides by 4,

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

$\Rightarrow -x = 2 - 2$ (Transposing 2 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,

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

$\Rightarrow \frac{4}{5} + 2 = p$ (Transposing -2 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,

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

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

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

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

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

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

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

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

Dividing both sides by 3,

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

$\Rightarrow 4 = t + 2$

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

$\Rightarrow 2 = t$

$\Rightarrow t = 2$

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

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

Dividing both sides by 5,

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

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

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

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

$\Rightarrow 0 = -8 + 4m$

$\Rightarrow 0 + 8 = 4m$ (Transposing -8 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:

$\Rightarrow 5x = 10$ …(i)

On subtracting 3 from both sides,

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

$\Rightarrow 5x - 3 = 7$ …(ii)

On dividing both sides by 2,

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

(b) $x = -2$

On subtracting 2 from both sides,

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

$\Rightarrow x - 2 = -4$ …(i)

Again, $x = -2$

On multiplying by 6,

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

$\Rightarrow 6x = -12$

On subtracting 12 from both sides,

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

$\Rightarrow 6x - 12 = -24$ …(ii)

On adding 24 to both sides,

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

$\Rightarrow 6x + 12 = 0$ …(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 times of this number $= 8x$

Hence, the equation is,

$8x + 4 = 60$

$\Rightarrow 8x = 60 - 4$ (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.

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

Hence, the equation is,

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

$\Rightarrow \frac{x}{5} = 3 + 4$ (Transposing -4 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.

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

Hence, the equation is,

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

$\Rightarrow \frac{3x}{4} = 21 - 3 = 18$ (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.

Twice of this number $= 2x$

Hence, the equation is,

$2x - 11 = 15$

$\Rightarrow 2x = 15 + 11$ (Transposing -11 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,

$50 - 3x = 8$

$\Rightarrow -3x = 8 - 50$ (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,

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

$\Rightarrow x + 19 = 40$

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

$\Rightarrow x = 21$

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

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

Hence, the equation is,

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

$\Rightarrow \frac{5x}{2} = 23 + 7$ (Transposing -7 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 × Lowest marks +7 = Highest marks

$\Rightarrow 2l + 7 = 87$

$\Rightarrow 2l = 87 - 7$ (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°.

$\Rightarrow b + b + 40° = 180°$

$\Rightarrow 2b + 40° = 180°$

$\Rightarrow 2b = 180^o - 40^o = 140^o$ (Transposing 40^o to R.H.S.)

On dividing both sides by 2,

$\Rightarrow \frac{2b}{2} = \frac{140°}{2}$

$\Rightarrow b = 70°$

Therefore, the base angles of the triangle are of 70^o 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 $= 5x$

$\Rightarrow 5x + 7 = 37$

$\Rightarrow 5x = 37 - 7 = 30$ (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 × Laxmi's age +4 = Her father's age

$\Rightarrow 3x + 4 = 49$

$\Rightarrow 3x = 49 - 4$ (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 × Number of fruit trees +2 = Number of non-fruit trees

$\Rightarrow 3x + 2 = 77$

$\Rightarrow 3x = 77 - 2$ (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,

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

$\Rightarrow 7x + 90 = 300$

$\Rightarrow 7x = 300 - 90$ (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.

♦♦♦