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Chapter 4: Simple Equations

Exercise 4.1 (Page 81)

Q1. Complete the last column of the table.

S. No	Equation	Value	Say, weather 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)	$\frac{m}{3} = 2$	$m = 6$	

Difficulty Level: Low

What is given /known

Equation and the value of the variable.

What is the unknown

Whether the given value is a solution of the equation or not.

Reasoning

Put the value of the variable in the given equation. If LHS is equal to the RHS then the equation is satisfied and if it is not that means this given value is not a solution of the equation.

Solution:

- (i) $x + 3 = 0$, $x = 3$
 L.H.S = $x + 3$, R.H.S = 0
 By putting, $x = 3$
 L.H.S = $3 + 3 = 6 \neq$ R.H.S

Therefore, “**No**”, the equation is not satisfied.

(ii) $x + 3 = 0$, $x = 0$
L.H.S = $x + 3$, R.H.S = 0
By putting, $x = 0$;
L.H.S = $0 + 3 = 3 \neq$ R.H.S

Therefore, “**No**”, the equation is not satisfied.

(iii) $x + 3 = 0$, $x = -3$
L.H.S = $x + 3$, R.H.S = 0
By putting, $x = -3$
L.H.S = $-3 + 3 = 0 =$ R.H.S

Therefore, “**Yes**”, the equation is satisfied.

(iv) $x - 7 = 1$, $x = 7$
L.H.S = $x - 7$, R.H.S = 1
By putting, $x = 7$;
L.H.S = $7 - 7 = 0 \neq$ R.H.S

Therefore, “**No**”, the equation is not satisfied.

(v) $x - 7 = 1$, $x = 8$
L.H.S = $x - 7$, R.H.S = 1
By putting, $x = 8$;
L.H.S = $8 - 7 = 1 =$ R.H.S

Therefore, “**Yes**”, the equation is satisfied.

(vi) $5x = 25$, $x = 0$,
L.H.S = $5x$, R.H.S = 25
By putting, $x = 0$;
L.H.S = $5 \times 0 = 0 \neq$ R.H.S

Therefore, “**No**”, the equation is not satisfied.

(vii) $5x = 25$, $x = 5$,
L.H.S = $5x$, R.H.S = 25
By putting, $x = 5$;
L.H.S = $5 \times 5 = 25 =$ R.H.S

Therefore, “**Yes**”, the equation is satisfied.

(viii) $5x = 25$, $x = -5$,
L.H.S = $5x$, R.H.S = 25
By putting, $x = -5$;
L.H.S = $5 \times (-5) = -25 \neq$ R.H.S

Therefore, “**No**”, the equation is not satisfied.

(ix) $\frac{m}{3} = 2, m = -6,$

L.H.S = $\frac{m}{3},$ R.H.S = 2

By putting, $m = -6;$

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

Therefore, “**No**”, the equation is not satisfied.

(x) $\frac{m}{3} = 2, m = 0,$

L.H.S = $\frac{m}{3},$ R.H.S = 2

By putting, $m = 0;$

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

Therefore, “**No**”, the equation is not satisfied.

(xi) $\frac{m}{3} = 2, m = 6,$

L.H.S = $\frac{m}{3},$ R.H.S = 2

By putting, $m = 6;$

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

Therefore, “**Yes**”, the equation is satisfied

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

Q2. 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) $4p - 3 = 13$ ($p = 0$)

Difficulty Level: Easy

What is given /known

Equation and the value of the variable.

What is the unknown

Whether the given value is a solution of the equation or not.

Reasoning

Put the value of the given variable in the equation. If LHS is equal to the RHS then the equation is satisfied and if it is not that means this given value is not a solution of the equation

Solution:

a) Here, $n + 5$ is L.H.S, 19 is R.H.S and $n = 1$ (given)

$$\text{L.H.S} = n + 5,$$

By putting, $n = 1$,

$$\text{L.H.S} = 1 + 5 = 6 \neq \text{R.H.S}$$

L.H.S \neq R.H.S, so $n = 1$ is not a solution of the equation.

b) Here, $7n + 5$ is L.H.S, 19 is R.H.S and $n = -2$ (given)

$$\text{L.H.S} = 7n + 5,$$

By putting, $n = -2$,

$$\text{L.H.S} = 7 \times (-2) + 5 = -9 \neq \text{R.H.S}$$

As, L.H.S \neq R.H.S, so $n = -2$ is not a solution of the equation.

c) Here, $7n + 5$ is L.H.S, 19 is R.H.S and $n = 2$ (given)

$$\text{L.H.S} = 7n + 5,$$

By putting, $n = 2$,

$$\text{L.H.S} = 7 \times (2) + 5 = 19 = \text{R.H.S}$$

As, L.H.S = R.H.S, so $n = 2$ is a solution of the equation.

d) Here, $4p - 3$ is L.H.S, 13 is R.H.S and $p = 1$ (given)

$$\text{L.H.S} = 4p - 3,$$

By putting, $p = 1$,

$$\text{L.H.S} = 4 \times (1) - 3 = 1 \neq \text{R.H.S}$$

As, L.H.S \neq R.H.S, so $p = 1$ is not a solution of the equation.

e) Here, $4p - 3$ is L. H.S, 13 is R.H.S and $p = -4$ (given)

$$4p$$

$$p$$

$$\text{L.H.S} = \frac{p}{4} - 3,$$

By putting, $p = 1$,

$$\text{L.H.S} = 4 \times (-4) - 3 = -19 \neq \text{R.H.S}$$

As, $\text{L.H.S} \neq \text{R.H.S}$, so $p = 1$ is not a solution.

f) Here, $\frac{p}{4} - 3$ is L. H.S, 13 is R.H.S and $p = 0$ (given data)

$$\text{L.H.S} = \frac{p}{4} - 3,$$

By putting, $p = 0$,

$$\text{L.H.S} = 4 \times (0) - 3 = -3 \neq \text{R.H.S}$$

As, $\text{L.H.S} \neq \text{R.H.S}$, so $p = 0$ is not a solution of the equation.

Q3. Solve the equation given below by trial and error method:

(i) $5p + 2 = 17$

(ii) $3m - 14 = 4$

Difficulty Level: Easy

What is given /known

Equations

What is the unknown

Solution of the equation or the value of the variable.

Reasoning

Put the different values of the variable in the given equation. If LHS is equal to the RHS then the equation is satisfied and if it is not that means this variable is not a solution of the equation.

Solution:

(i) $5p + 2 = 17$

$$5p + 2 = \text{L.H.S}$$

By putting, $p = 0$,

$$5 \times 0 + 2 = 2 \neq 17$$

By putting, $p = 1$,

$$5 \times (1) + 2 = 7 \neq 17$$

By putting, $p = 2$,

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

By putting, $p = 3$,

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

Therefore, $p = 3$ is a solution of the equation.

(ii) $3m - 14 = 4$
 $3m - 14 = \text{L.H.S}$
By putting, $m = 5$,
 $3 \times (5) - 14 = 1 \neq 6$
By putting, $m = 6$,
 $3 \times (6) - 14 = 4 = \text{R.H.S.}$

Therefore, $m = 6$ is a solution of the equation.

Q4. 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.

Difficulty Level: Easy

What is given /known

Statements of the equations.

What is the unknown

Equations for the given statement.

Reasoning

This question is very simple. Read the statement carefully and frame the equation in steps.

Solution:

- i) $x + 4 = 9$
- ii) $y - 2 = 8$
- iii) $10a = 70$
- iv) $\frac{b}{5} = 6$
- v) $\frac{3}{4}t = 15$
- vi) $7m + 7 = 77$
- vii) $\frac{1}{4}x - 4 = 4$
- viii) $6y - 6 = 60$
- ix) $\frac{1}{3}z + 3 = 30$

Q5. 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) $\frac{p}{2} + 2 = 8$

Difficulty Level: Medium

What is given /known

Equations

What is the unknown

Statements of the given equations.

Reasoning

To solve this question, look at the equation carefully and decide the variable and numbers. Then write the suitable statement using the variables and numbers.

Solution:

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

Q6. 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).

Difficulty Level: Medium

What is given /known

Statements of the equations.

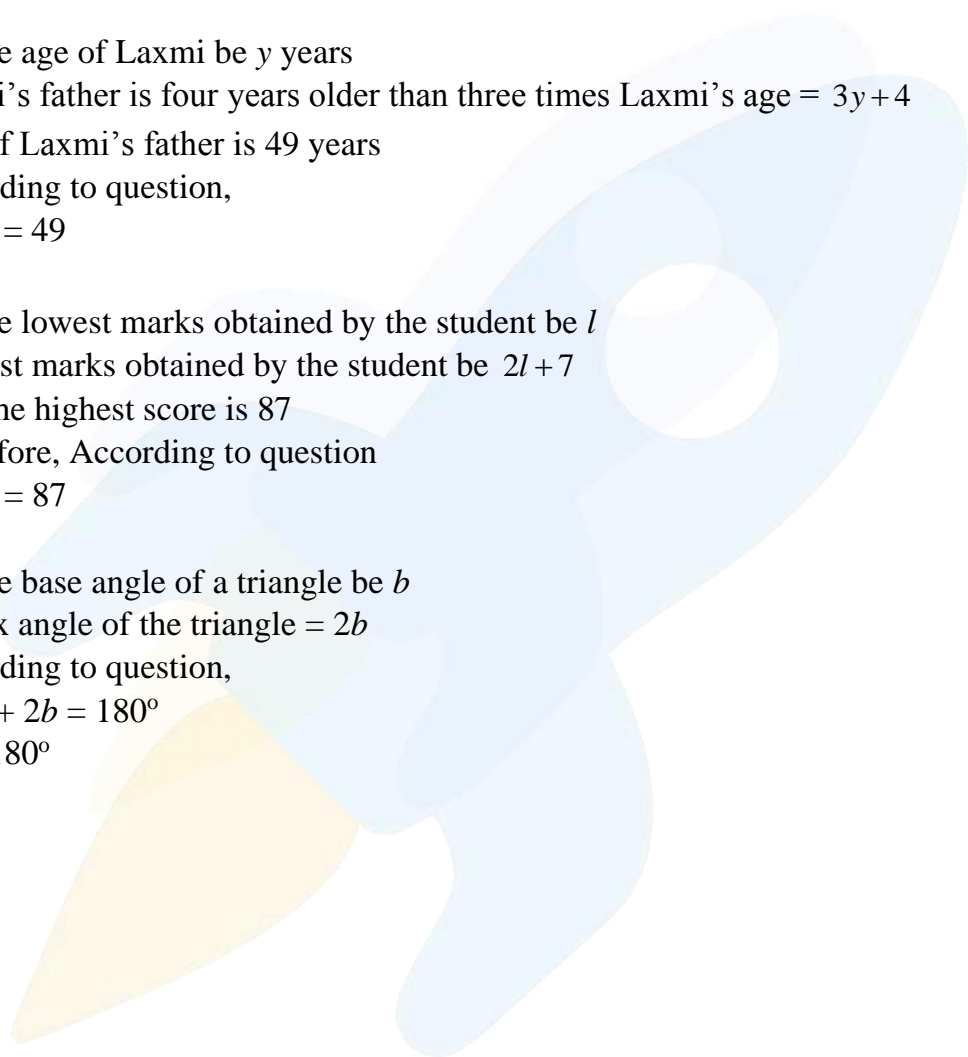
What is the unknown

Equations for the different statements.

Reasoning

Read the statement carefully and frame the equation.

Solution:

- (i) Let permit has m number of marbles
Number of marbles Irfan has = $5m + 7$
Total number of marbles Irfan has 37
So, $5m + 7 = 37$
- (ii) Let the age of Laxmi be y years
Laxmi's father is four years older than three times Laxmi's age = $3y + 4$
Age of Laxmi's father is 49 years
According to question,
 $3y + 4 = 49$
- (iii) Let the lowest marks obtained by the student be l
Highest marks obtained by the student be $2l + 7$
And the highest score is 87
Therefore, According to question
 $2l + 7 = 87$
- (iv) Let the base angle of a triangle be b
Vertex angle of the triangle = $2b$
According to question,
 $b + b + 2b = 180^\circ$
 $4b = 180^\circ$
- 

Chapter 4: Simple Equations

Exercise 4.2 (Page 86)

Q1. 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) $y + 4 = -4$

Difficulty Level: Easy

What is given /known

Equations.

What is the unknown

The first step which should be used to separate the variable in order to solve the equation.

Reasoning

First try to reduce the equation by adding or subtracting by the same number and get the value of variable.

Solution:

(a) $x - 1 = 0$

Adding one to both sides of the equation we get,

$$x - 1 + 1 = 0 + 1$$

$$x = 1$$

(b) $x + 1 = 0$

Subtracting one from both sides of the equation we get,

$$x + 1 - 1 = 0 - 1$$

$$x = -1$$

(c) $x - 1 = 5$

Adding one to both sides of the equation we get,

$$x - 1 + 1 = 5 + 1$$

$$x = 6$$

(d) $x + 6 = 2$

Subtracting 6 from both sides of the equation we get,

$$x + 6 - 6 = 2 - 6$$

$$x = -4$$

(e) $y - 4 = -7$

Adding 4 to both sides of the equation we get,

$$y - 4 + 4 = -7 + 4$$

$$y = -3$$

(f) $y - 4 = 4$

Adding 4 to both sides of the equation we get,

$$y - 4 + 4 = 4 + 4$$

$$y = 8$$

(g) $y + 4 = 4$

Subtracting 4 from both sides of the equation we get,

$$y + 4 - 4 = 4 - 4$$

$$y = 0$$

(h) $y + 4 = -4$

Subtracting 4 from both sides of the equation we get,

$$y + 4 - 4 = -4 - 4$$

$$y = -8$$

Q2. 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) $20t = -10$

Difficulty Level: Medium

What is given /known

Equation.

What is the unknown

The first step we use to separate the variable in order to solve the equations.

How can you use the known information to arrive at the solution?

First try to reduce the equation by multiplying or dividing both sides of the equation by the same number to obtain the value of variable.

Solution:

(a) $3l = 42$

Divide both the sides by 3 we get,

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

$$l = 14$$

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

Multiplying both sides by 2,

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

$$b = 12$$

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

Multiplying both sides by 7,

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

$$p = 28$$

(d) $4x = 25$

Dividing both the sides by 4 we get,

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

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

(e) $8y = 36$

Dividing both the sides by 8 we get,

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

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

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

Multiplying both sides by 3 we get,

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

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

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

Multiplying both sides by 5 we get,

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

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

(h) $20t = -10$

Multiplying both sides by 20 we get,

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

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

Q3. 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) $\frac{3p}{10} = 6$

Difficulty Level: Moderate

What is given /known

Equations

What is the unknown

The first step we use to separate the variable in order to solve the equations.

How can you use the known information to arrive at the solution?

First try to reduce the equation by adding, subtracting, multiplying or dividing both sides of the equation by the same number to get the value of variable.

Solution:

(a) $3n - 2 = 46$

Adding 2 to both sides of the equation, we get

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

$$3n = 48$$

Dividing both the sides by 3 we get,

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

$$n = 16$$

(b) $5m + 7 = 17$

Subtracting 7 from both sides of the equation, we get

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

$$5m = 10$$

Dividing both the sides by 5 we get,

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

$$m = 2$$

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

Multiplying both the sides by 3 we get,

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

$$20p = 120$$

Dividing both the sides by 20 we get,

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

$$p = 6$$

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

Multiplying both the sides by 10 we get,

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

$$3p = 60$$

Dividing both the sides by 3 we get,

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

$$p = 20$$

Q4. 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) $2q + 6 = 12$

Difficulty Level: Medium

What is given /known

Equations

What is the unknown

Value of the variable.

Reasoning

First try to reduce the equation by adding, subtracting, multiplying or dividing by the same number and get the value of variable.

Solution:

(a) $10p = 100$

Dividing both the sides by 10 we get,

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

$$p = 10$$

(b) $10p + 10 = 100$

Subtracting 10 from both sides we get,

$$10p + 10 - 10 = 100 - 10$$

$$10p = 90$$

Dividing both the sides by 10 we get,

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

$$p = 9$$

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

Multiplying both the sides by 4 we get,

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

$$p = 20$$

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

Multiplying both the sides by 3 ,

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

$$-p = 15$$

$$p = -15$$

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

Multiplying both the sides by 4,

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

$$3p = 24$$

Dividing both the sides by 3 we get,

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

$$p = 8$$

(f) $3s = -9$

Dividing both the sides by 3,

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

$$p = -3$$

(g) $3s + 12 = 0$

Subtracting 12 from both the sides of the equation we get,

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

$$3s = -12$$

Dividing both the sides by 3 we get,

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

$$p = -4$$

(h) $3s = 0$

Dividing both the sides by 3 we get,

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

$$p = 0$$

(i) $2q = 6$

Dividing both the sides by 2 we get,

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

$$q = 3$$

(j) $2q - 6 = 0$

Adding 6 to both sides of the equation we get,

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

$$2q = 6$$

Dividing both the sides by 2 we get,

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

$$p = 3$$

(k) $2q + 6 = 0$

Subtracting 6 from both the sides of the equation we get,

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

$$2q = -6$$

Dividing both the sides by 2 we get,

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

$$p = -3$$

(1) $2q + 6 = 12$

Subtracting 6 from both the sides of the equation we get,

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

$$2q = 6$$

Dividing both the sides by 2 we get,

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

$$q = 3$$



Chapter 4: Simple Equations

Exercise 4.3 (Page 89)

Q1. 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) $\frac{2b}{3} - 5 = 3$

Difficulty Level: Low

What is given /known

Equations.

What is the unknown

Solution of the equations (The value of the variable).

Reasoning

To solve these equations, first transpose the variables on the one side and constants on the other side, then simplify them and get the value of variable.

Solution:

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

Transposing $\frac{5}{2}$ to R.H.S we get,

$$2y = \frac{37}{2} - \frac{5}{2}$$

$$2y = \frac{32}{2} = 16$$

$$y = \frac{16}{2} = 8$$

(b) $5t + 28 = 10$

Transposing 28 to R.H.S we get,

$$5t = 10 - 28$$

$$5t = -18$$

$$t = \frac{-18}{5}$$

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

Transposing 3 to R.H.S we get,

$$\frac{a}{5} = 2 - 3$$

$$\frac{a}{5} = -1$$

$$a = -5$$

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

Transposing 7 to R.H.S we get,

$$\frac{q}{4} = 5 - 7$$

$$\frac{q}{4} = -2$$

$$q = -8$$

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

$$5x = -5 \times 2$$

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

$$x = -2$$

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

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

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

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

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

Transposing $\frac{19}{2}$ to the R.H.S.

$$7m = 13 - \frac{19}{2}$$

$$7m = \frac{26 - 19}{2}$$

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

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

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

$$(h) \quad 6z + 10 = -2$$

Transposing 10 to the R.H.S.

$$6z = -2 - 10$$

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

$$z = -2$$

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

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

$$l = \frac{4}{9}$$

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

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

$$\frac{2b}{3} = 8$$

$$b = 8 \times \frac{3}{2}$$

$$b = 12$$

Q2. 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) $4(2 - x) = 8$

Difficulty Level: Medium

What is given /known

Equations.

What is the unknown

The value of the variable.

Reasoning

To solve these equations, transpose the variables on the one side and constants on the other side, and simplify them and get the value of variable.

Solution:

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

$$2x + 8 = 12$$

$$2x = 12 - 8$$

$$2x = 4$$

$$x = \frac{4}{2} \quad \text{or} \quad x = 2$$

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

$$3n - 15 = 21$$

$$3n = 21 + 15$$

$$3n = 36$$

$$n = \frac{36}{3} \quad \text{or} \quad n = 12$$

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

$$3n - 15 = -21$$

$$3n = -21 + 15$$

$$3n = -6$$

$$n = \frac{-6}{3} \quad \text{or} \quad n = -2$$

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

$$-8 - 4x = 8$$

$$-4x = 8 + 8$$

$$-4x = 16$$

$$x = \frac{-16}{4} = -4$$

$$\begin{aligned} \text{(e)} \quad & 4(2 - x) = 8 \\ & 8 - 4x = 8 \\ & -4x = 8 - 8 = 0 \\ \text{or} \quad & x = 0 \end{aligned}$$

Q3. Solve the following equations.

$$\text{(a)} \quad 4 = 5(p - 2)$$

$$\text{(b)} \quad -4 = 5(p - 2)$$

$$\text{(c)} \quad 16 = 4 + 3(t + 2)$$

$$\text{(d)} \quad 4 + 5(p - 1) = 34$$

$$\text{(e)} \quad 0 = 16 + 4(m - 6)$$

Difficulty Level: Low

What is the unknown

The value of the variable

What is given /known

Equations.

Reasoning

Transpose the variables on the one side and constants on the other side, then simplify them and get the value of variable.

Solution:

$$\text{(a)} \quad 4 = 5(p - 2)$$

$$4 = 5p - 10$$

$$5p = 4 + 10$$

$$\text{Therefore, } p = \frac{14}{5}$$

$$\text{(b)} \quad -4 = 5(p - 2)$$

$$-4 = 5p - 10$$

$$-4 + 10 = 5p$$

$$6 = 5p$$

$$\text{Therefore, } p = \frac{6}{5}$$

$$\text{(c)} \quad 16 = 4 + 3(t + 2)$$

$$16 = 4 + 3t + 6$$

$$16 - 10 = 3t$$

$$6 = 3t$$

$$t = \frac{6}{3} = 2$$

$$\begin{aligned} \text{(d)} \quad 4 + 5(p - 1) &= 34 \\ 4 + 5p - 5 &= 34 \\ 5p - 1 &= 34 \\ 5p &= 35 \\ p &= \frac{35}{5} \\ p &= 7 \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad 0 &= 16 + 4(m - 6) \\ 0 &= 16 + 4m - 24 \\ 8 &= 4m \\ m &= \frac{8}{4} \\ m &= 2 \end{aligned}$$

- Q4.** (a) Construct 3 equations starting with $x = 2$
(b) Construct 3 equations starting with $x = -2$

Difficulty Level: Low

What is the unknown

3 equations starting with $x = 2$ and 3 equations starting with $x = -2$

What is given /known

Value of the variables; $x = 2$ and $x = -2$

Reasoning

You can get the equation by adding, multiplying or subtracting the same value on both sides of the equation.

Solution:

- (a) 3 equations starting with $x = 2$

(i)

Multiplying both sides by 10,

$$10x = 20$$

Adding 2 to both sides ,

$$10x + 2 = 20 + 2$$

$$10x + 2 = 22$$

(ii)

Multiplying both sides by 5,

$$5x = 10$$

subtracting 3 to both sides,

$$5x - 3 = 10 - 3$$

$$5x - 3 = 7$$

(ii) $x = 2$

multiplying both sides by 2,

$$2x = 4$$

subtracting 3 to both sides,

$$2x - 3 = 4 - 3$$

$$2x - 3 = 1$$

(b) 3 equations starting with $x = -2$

(i) $x = -2$

Multiplying both sides by 3,

$$3x = -6$$

(ii) $x = -2$

Multiplying both sides by 3,

$$3x = -6$$

Adding 7 to both sides we get.

$$3x + 7 = -6 + 7$$

$$3x + 7 = 1$$

(iii) $x = -2$

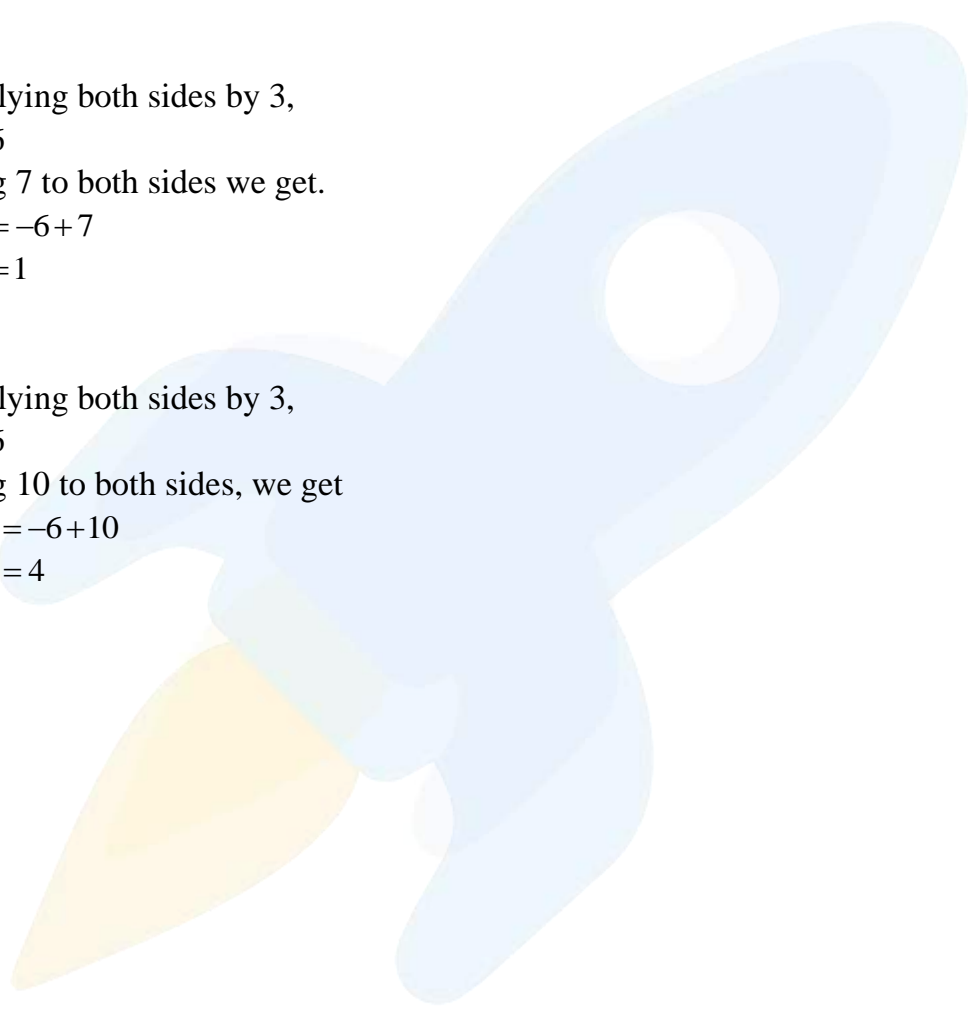
Multiplying both sides by 3,

$$3x = -6$$

Adding 10 to both sides, we get

$$3x + 10 = -6 + 10$$

$$3x + 10 = 4$$



Chapter 4: Simple Equations

Exercise 4.4 (Page 91)

- Q1.** Set up equations and solve them to find the unknown numbers in the following cases:
- Add 4 to eight times a number; you get 60.
 - One fifth of a number minus 4 gives 3.
 - If I take three fourths of a number and add 3 to it, I get 21.
 - When I subtracted 11 from twice a number, the result was 15.
 - Munna subtracts thrice the number of notebooks he has from 50, he finds the result to be 8.
 - Ibenhal thinks of a number. If she adds 19 to it and divides the sum by 5, she will get 8.
 - Anwar thinks of a number. If he takes away 7 from $\frac{5}{2}$ of the number, the result is 23.

Difficulty Level: Low

What is given /known

Statement of the Equation.

What is the unknown

Equation and the value of the variable which satisfy the equation.

Reasoning

First read the statement of the question carefully suppose the number as any variable or alphabet then follow the steps given in the question and form the equation then solve the equation.

Solution:

- (a) Let the number be x . According to the question,

$$8x + 4 = 60$$

$$8x = 60 - 4 = 56$$

$$x = \frac{56}{8} = 7$$

(b) Let the number be y . According to question,

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

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

$$\frac{y}{5} = 7$$

$$y = 35$$

(c) Let the number be x . According to question,

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

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

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

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

$$x = 24$$

(d) Let the number be x . According to question,

$$2x - 11 = 15$$

$$2x = 15 + 11$$

$$2x = 26$$

$$x = \frac{26}{2} = 13$$

(e) Let the number be x . According to question,

$$50 - 3x = 8$$

$$-3x = 8 - 50 = -42$$

$$x = \frac{-42}{-3} = 14$$

(f) Let the number be z . According to question,

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

$$z + 19 = 40$$

$$z = 40 - 19 = 21$$

(g) Let the number be x . According to question,

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

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

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

$$x = 30 \times \frac{2}{5} = 12$$

Q2. Solve the following:

- 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?
- 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°).
- Smitha's mother is 34 years old. Two years from now mother's age will be 4 times Smitha's present age. What is Smitha's present age?
- 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?

Difficulty Level: Medium

What is given /known

Statement of questions.

What is the unknown

Equation and the value of the variable.

Reasoning

Make suitable equation using the given information and then solve the equation.

Solution:

(a) Highest score is 87. Let the lowest marks be x

According to question, highest marks obtained = $2x + 7$

$$87 = 2x + 7$$

$$87 - 7 = 2x$$

$$80 = 2x$$

$$x = 40$$

- (b) Let the base angle be b . Since the triangle is isosceles, the other base angle will also be b . Vertex angle is given 40° .

Since, the sum of three angles of a triangle = 180°

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

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

$$2b = 180^\circ - 40^\circ = 140^\circ$$

$$b = \frac{140}{2} = 70^\circ$$

- (c) Let the present age of Smitha be x . Age of her mother = 34 years

Two years from now Smitha age will be = $x + 2$

According to question,

$$4(x + 2) = 34$$

$$4x + 8 = 34$$

$$4x = 34 - 8 = 16$$

$$x = 4$$

- (d) Let the score of Rahul be x , and score of Sachin be $2x$

According to question,

$$x + 2x = 198$$

$$3x = 198$$

$$x = \frac{198}{3} = 66$$

So, Rahul's score = 66 runs

And. Sachin's score = $2x = 132$ runs

Q3. Solve the following:

- 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?
- Laxmi's father is 49 years old. He is 4 years older than three times Laxmi's age. What is Laxmi's age?
- 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?

Difficulty Level: Medium

What is given/known

Statement of the question.

What is the unknown

Equation and the value of the variable.

Reasoning

Make suitable equation using the given information and then solve the equation.

Solution:

(a) Number of marbles Parmit has 37. Let the number of marbles Parmit has be x .
According to question,

$$5x + 7 = 37$$

$$5x = 30$$

$$x = \frac{30}{5} = 6$$

Therefore, Parmit has 6 marbles

(b) Let the age of Laxmi be x . Age of Laxmi's father be 49 years
According to question,

$$3x + 4 = 49$$

$$3x = 49 - 4 = 45$$

$$x = \frac{45}{3} = 15$$

Therefore, Laxmi's age is 15 years

(c) Let the number of fruit trees be x . Then the number of non-fruit trees are $3x + 2$
According to question,

$$3x + 2 = 77$$

$$3x = 77 - 2 = 75$$

$$x = \frac{75}{3} = 25$$

The number of fruit trees planted are 25.

Q4. 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!

Difficulty Level: Low

What is given /known

A riddle.

What is the unknown

The number in the riddle.

Reasoning

Use the given information to make an equation with unknown number as a variable.
Solve the equation to get value of the number.

Solution:

Let the number be x .

According to question,

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

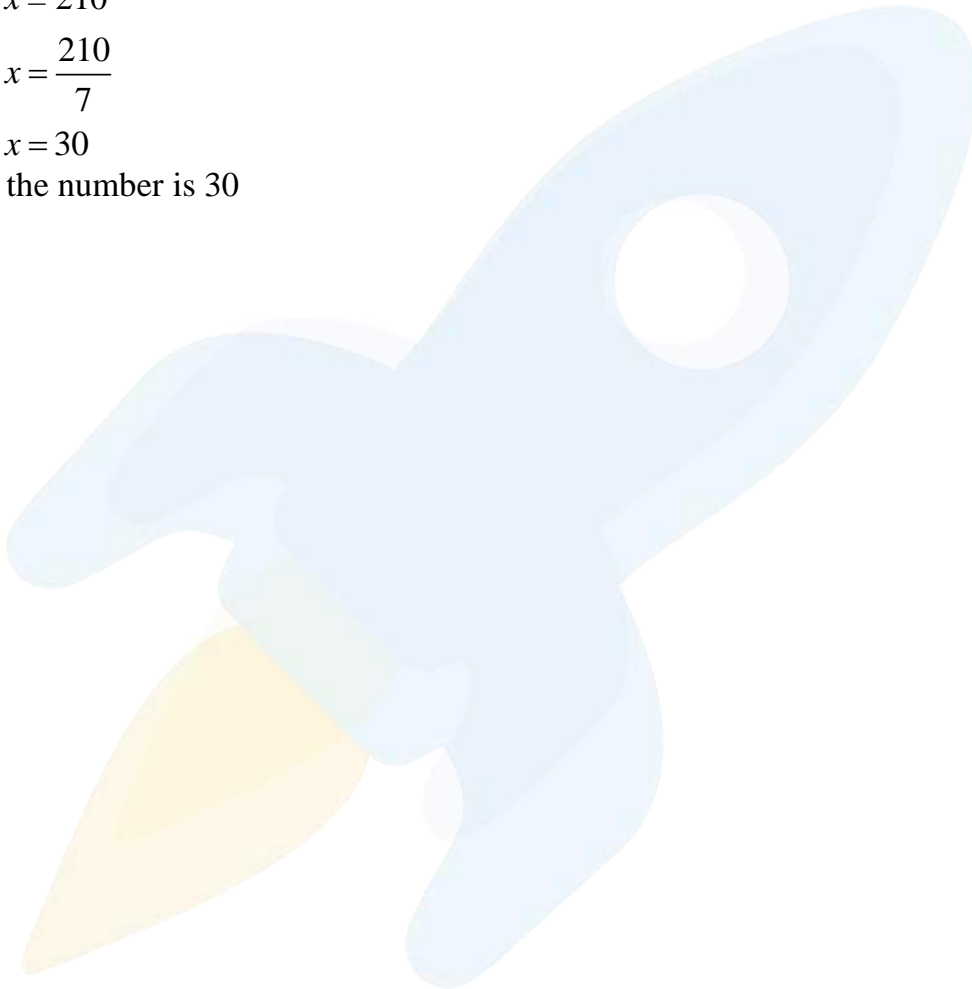
$$7x = 300 - 90$$

$$7x = 210$$

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

$$x = 30$$

Therefore, the number is 30



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