Mathematics

(Chapter – 4) (Simple Equations)

(Class – VII)

Exercise 4.1

Question 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)	$5x=25$	$x=-5$	
(viii)	$\frac{m}{3}=2$	$m=-6$	
(ix)	$\frac{m}{3}=2$	$m=0$	
(x)	$\frac{m}{3}=2$	$m=6$	

Answer 1:

S. No.	Equation	Value	Say, whether 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
(viii)	$\frac{m}{3} = 2$	$m = -6$	No
(ix)	$\frac{m}{3} = 2$	$m = 0$	No
(x)	$\frac{m}{3} = 2$	$m = 6$	Yes

Question 2:

Check whether the value given in the brackets is a solution to the given equation or not:

(a) $n+5=19\left(n=1\right)$

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

(c) $7n+5=19\left(n=2\right)$

(d) $4p-3=13\left(p=1\right)$

(e) $4p-3=13\left(p=-4\right)$

(f) $4p-3=13\left(p=0\right)$

Answer 2:

(a) $n+5=19\left(n=1\right)$

Putting $n=1$ in L.H.S.,

1 + 5 = 6

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

$\therefore$ $n=1$ is not the solution of given equation.

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

Putting $n=-2$ in L.H.S.,

$7\left(-2\right)+5=-14+5=-9$

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

$\therefore$ $n=-2$ is not the solution of given equation.

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

Putting $n=2$ in L.H.S.,

$7(2)+5=14+5=19$

$\because$ L.H.S. = R.H.S.,

$\therefore$ $n=2$ is the solution of given equation.

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

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

$4(1)-3=4-3=1$

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

$\therefore$ $p=1$ is not the solution of given equation.

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

Putting $p=-4$ in L.H.S.,

$4(-4)-3=-16-3=-19$

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

$\therefore$ $p=-4$ is not the solution of given equation.

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

Putting $p=0$ in L.H.S.,

$4(0)-3=0-3=-3$

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

$\therefore$ $p=0$ is not the solution of given equation.

Question 3:

Solve the following equations by trial and error method:

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

Answer 3:

(i) $5p+2=17$

Putting $p=-3$ in L.H.S. $5(-3)+2 = -15+2=-13$

$\because$ $-13\neq17$ Therefore, $p=-3$ is not the solution.

Putting $p=-2$ in L.H.S. $5(-2)+2=-10+2=-8$

$\because -8\neq 17$ Therefore, $p=-2$ is not the solution.

Putting $p=-1$ in L.H.S. $5(-1)+2=-5+2=-3$

$\because -3\neq 17$ Therefore, $p=-1$ is not the solution.

Putting $p=0$ in L.H.S. $5(0)+2=0+2=2$

$\because 2\neq 17$ Therefore, $p=0$ is not the solution.

Putting $p=1$ in L.H.S. $5(1)+2=5+2=7$

$\because 7\neq 17$ Therefore, $p=1$ is not the solution.

Putting $p=2$ in L.H.S. $5(2)+2=10+2=12$

$\because 12\neq 17$ Therefore, $p=2$ is not the solution.

Putting $p=3$ in L.H.S. $5(3)+2=15+2=17$

$\because 17=17$ Therefore, $p=3$ is the solution.

(ii) $3m-14=4$

Putting $m=-2$ in L.H.S. $3(-2)-14=-6-14=-20$

$\because -20\neq 4$ Therefore, $m=-2$ is not the solution.

Putting $m=-1$ in L.H.S. $3(-1)-14=-3-14=-17$

$\because -17\neq 4$ Therefore, $m=-1$ is not the solution.

Putting $m=0$ in L.H.S. $3(0)-14=0-14=-14$

$\because -14\neq 4$ Therefore, $m=0$ is not the solution.

Putting $m=1$ in L.H.S. $3(1)-14=3-14=-11$

$\because -11\neq 4$ Therefore, $m=1$ is not the solution.

Putting $m=2$ in L.H.S. $3(2)-14=6-14=-8$

$\because -8\neq 4$ Therefore, $m=2$ is not the solution.

Putting $m=3$ in L.H.S. $3(3)-14=9-14=-5$

$\because -5\neq 4$ Therefore, $m=3$ is not the solution.

Putting $m=4$ in L.H.S. $3(4)-14=12-14=-2$

$\because -2\neq 4$ Therefore, $m=4$ is not the solution.

Putting $m=5$ in L.H.S. $3(5)-14=15-14=1$

$\because 1\neq 4$ Therefore, $m=5$ is not the solution.

Putting $m=6$ in L.H.S. $3(6)-14=18-14=4$

$\because 4=4$ Therefore, $m=6$ is the solution.

Question 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.

Answer 4:

(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) $\frac{x}{4}-4=4$

(viii) $6y-6=60$

(ix) $\frac{z}{3}+3=30$

Question 5:

Write the following equations in statement form:

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

Answer 5:

(i) The sum of numbers p and 4 is 15.

(ii) 7 subtracted from m is 3.

(iii) Two times m is 7.

(iv) The number m is divided by 5 gives 3.

(v) Three-fifth of the number m is 6.

(vi) Three times p plus 4 gets 25.

(vii) If you take away 2 from 4 times p, you get 18.

(viii) If you added 2 to half is p, you get 8.

Question 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. (Tale 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 are 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 $180°$.)

Answer 6:

(i) Let m be the number of Parmit's marbles.

$\therefore \quad 5m+7=37$

(ii) Let the age of Laxmi be y years.

$\therefore \quad 3y+4=49$

(iii) Let the lowest score be l.

$\therefore \quad 2l+7=87$

(iv) Let the base angle of the isosceles triangle be b, so vertex angle = $2b$.

$\therefore \quad 2b+b+b=180°$

$\Rightarrow \quad 4b=180°$ [Angle sum property of a Δ]

Exercise 4.2

Question 1:

Give first the step you will use to separate the variable and then solve the equations:

(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) $y+4=-4$

Answer 1:

(a) $x-1=0$

$\Rightarrow \quad x-1+1=0+1$ [Adding 1 both sides]

$\Rightarrow \quad x=1$

(b) $x+1=0$

$\Rightarrow \quad x+1-1=0-1$ [Subtracting 1 both sides]

$\Rightarrow \quad x=-1$

(c) $x-1=5$

$\Rightarrow \quad x-1+1=5+1$ [Adding 1 both sides]

$\Rightarrow \quad x=6$

(d) $x+6=2$

$\Rightarrow \quad x+6-6=2-6$ [Subtracting 6 both sides]

$\Rightarrow \quad x=-4$

(e) $y-4=-7$

$\Rightarrow \quad y-4+4=-7+4$ [Adding 4 both sides]

$\Rightarrow \quad y=-3$

(f) $y-4=4$

$\Rightarrow \quad y-4+4=4+4$ [Adding 4 both sides]

$\Rightarrow \quad y=8$

(g) $y+4=4$

$\Rightarrow \quad y+4-4=4-4$ [Subtracting 4 both sides]

$\Rightarrow \quad y=0$

(h) $y+4=-4$

$\Rightarrow \quad y+4-4=-4-4$ [Subtracting 4 both sides]

$\Rightarrow \quad y=-8$

Question 2:

Give first the step you will use to separate the variable and then solve the equations

(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) $20t = -10$

Answer 2:

(a) $3l = 42$

$\Rightarrow \quad \frac{3l}{3} = \frac{42}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad l = 14$

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

$\Rightarrow \quad \frac{b}{2} \times 2 = 6 \times 2$ [Multiplying both sides by 2]

$\Rightarrow \quad b = 12$

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

$\Rightarrow \quad \frac{p}{7} \times 7 = 4 \times 7$ [Multiplying both sides by 7]

$\Rightarrow \quad p = 28$

(d) $4x = 25$

$\Rightarrow \quad \frac{4x}{4} = \frac{25}{4}$ [Dividing both sides by 4]

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

(e) $8y = 36$

$\Rightarrow \quad \frac{8y}{8} = \frac{36}{8}$ [Dividing both sides by 8]

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

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

$\Rightarrow \quad \frac{z}{3}\times 3=\frac{5}{4}\times 3$ [Multiplying both sides by 3]

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

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

$\Rightarrow \quad \frac{a}{5}\times 5=\frac{7}{15}\times 5$ [Multiplying both sides by 5]

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

(h) $20t=-10$

$\Rightarrow \quad \frac{20t}{20}=\frac{-10}{20}$ [Dividing both sides by 20]

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

Question 3:

Give first the step you will use to separate the variable and then solve the equations

(a) $3n-2=46$ (b) $5m+7=17$

(c) $\frac{20p}{3}=40$ (d) $\frac{3p}{10}=6$

Answer 3:

(a) $3n-2=46$

Step I: $3n-2+2=46+2$

$\Rightarrow \quad 3n=48$ [Adding 2 both sides]

Step II: $\frac{3n}{3}=\frac{48}{3}$

$\Rightarrow \quad n=16$ [Dividing both sides by 3]

(b) $5m+7=17$

Step I: $5m+7-7=17-7$

$\Rightarrow \quad 5m=10$ [Subtracting 7 both sides]

Step II: $\frac{5m}{5}=\frac{10}{5}$

$\Rightarrow \quad m=2$ [Dividing both sides by 5]

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

Step I: $\frac{20p}{3} \times 3 = 40 \times 3$

$\Rightarrow \quad 20p = 120$ [Multiplying both sides by 3]

Step II: $\frac{20p}{20} = \frac{120}{20}$

$\Rightarrow \quad p = 6$ [Dividing both sides by 20]

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

Step I: $\frac{3p}{10} \times 10 = 6 \times 10$

$\Rightarrow \quad 3p = 60$ [Multiplying both sides by 10]

Step II: $\frac{3p}{3} = \frac{60}{3}$

$\Rightarrow \quad p = 20$ [Dividing both sides by 3]

Question 4:

Solve the following equation:

(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) $2q + 6 = 12$

Answer 4:

(a) $10p = 100$

$\Rightarrow \quad \frac{10p}{10} = \frac{100}{10}$ [Dividing both sides by 10]

$\Rightarrow \quad p = 10$

(b) $10p + 10 = 100$

$\Rightarrow \quad 10p + 10 - 10 = 100 - 10$ [Subtracting both sides 10]

$\Rightarrow \quad 10p = 90$

$\Rightarrow \quad \frac{10p}{10} = \frac{90}{10}$ [Dividing both sides by 10]

$\Rightarrow \quad p = 9$

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

$\Rightarrow \quad \frac{p}{4} \times 4 = 5 \times 4$ [Multiplying both sides by 4]

$\Rightarrow \quad p = 20$

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

$\Rightarrow \quad \frac{-p}{3} \times (-3) = 5 \times (-3)$ [Multiplying both sides by – 3]

$\Rightarrow \quad p = -15$

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

$\Rightarrow \quad \frac{3p}{4} \times 4 = 6 \times 4$ [Multiplying both sides by 4]

$\Rightarrow \quad 3p = 24$

$\Rightarrow \quad \frac{3p}{3} = \frac{24}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad p = 8$

(f) $3s = -9$

$\Rightarrow \quad \frac{3s}{3} = \frac{-9}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad s = -3$

(g) $3s + 12 = 0$

$\Rightarrow \quad 3s + 12 - 12 = 0 - 12$ [Subtracting both sides 10]

$\Rightarrow \quad 3s = -12$

$\Rightarrow \quad \frac{3s}{3} = \frac{-12}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad s = -4$

(h) $3s = 0$

$\Rightarrow \quad \frac{3s}{3} = \frac{0}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad s = 0$

(i) $2q = 6$

$\Rightarrow \quad \frac{2q}{2} = \frac{6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q = 3$

(j) $2q - 6 = 0$

$\Rightarrow \quad 2q - 6 + 6 = 0 + 6$ [Adding both sides 6]

$\Rightarrow \quad 2q = 6$

$\Rightarrow \quad \frac{2q}{2} = \frac{6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q = 3$

(k) $2q + 6 = 0$

$\Rightarrow \quad 2q + 6 - 6 = 0 - 6$ [Subtracting both sides 6]

$\Rightarrow \quad 2q = -6$

$\Rightarrow \quad \frac{2q}{2} = \frac{-6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q = -3$

(l) $2q + 6 = 12$

$\Rightarrow \quad 2q + 6 - 6 = 12 - 6$ [Subtracting both sides 6]

$\Rightarrow \quad 2q = 6$

$\Rightarrow \quad \frac{2q}{2} = \frac{6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q = 3$

Exercise 4.3

Question 1:

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) $\frac{5}{2}x=10$ (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) $\frac{2b}{3}-5=3$

Answer 1:

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

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

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

$\Rightarrow \quad 2y=\frac{32}{2}$

$\Rightarrow \quad 2y=16$

$\Rightarrow \quad y=\frac{16}{2}$

$\Rightarrow \quad y=8$

(b) $5t+28=10$

$\Rightarrow \quad 5t=10-28$

$\Rightarrow \quad 5t=-18$

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

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

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

$$\Rightarrow \quad \frac{a}{5} = -1$$
$$\Rightarrow \quad a = -1 \times 5$$
$$\Rightarrow \quad a = -5$$

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

$$\Rightarrow \quad \frac{q}{4} = 5 - 7$$
$$\Rightarrow \quad \frac{q}{4} = -2$$
$$\Rightarrow \quad q = -2 \times 4$$
$$\Rightarrow \quad q = -8$$

(e) $\frac{5}{2}x = 10$

$$\Rightarrow \quad 5x = 10 \times 2$$
$$\Rightarrow \quad 5x = 20$$
$$\Rightarrow \quad x = \frac{20}{5}$$
$$\Rightarrow \quad x = 4$$

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

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

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

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

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

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

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

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

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

$$\Rightarrow \quad 6z = -2 - 10$$

$$\Rightarrow \quad 6z = -12$$

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

$$\Rightarrow \quad z = -2$$

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

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

$$\Rightarrow \quad 3l = \frac{4}{3}$$

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

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

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

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

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

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

$$\Rightarrow \quad 2b = 24$$

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

$$\Rightarrow \quad b = 12$$

Question 2:

Solve the following equations:

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

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

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

(d) $3-2(2-y)=7$

(e) $-4(2-x)=9$

(f) $4(2-x)=9$

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

(h) $34-5(p-1)=4$

Answer 2:

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

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

$\Rightarrow \quad x+4=6$

$\Rightarrow \quad x=6-4$

$\Rightarrow \quad x=2$

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

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

$\Rightarrow \quad n-5=7$

$\Rightarrow \quad n=7+5$

$\Rightarrow \quad n=12$

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

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

$\Rightarrow \quad n-5=-7$

$\Rightarrow \quad n=-7+5$

$\Rightarrow \quad n=-2$

(d) $3-2(2-y)=7$

$\Rightarrow \quad -2(2-y)=7-3$

$\Rightarrow \quad -2(2-y)=4$

$\Rightarrow \quad 2-y=\frac{4}{-2}$

$\Rightarrow \quad 2-y=-2$

$\Rightarrow \quad -y=-2-2$

$\Rightarrow \quad -y=-4$

$\Rightarrow \quad y=4$

(e) $-4(2-x)=9$

$\Rightarrow \quad -4\times 2-x\times(-4)=9$

$\Rightarrow \quad -8+4x=9$

$\Rightarrow \quad 4x=9+8$

$\Rightarrow \quad 4x=17$

$\Rightarrow \quad x=\frac{17}{4}$

(f) $4(2-x)=9$

$\Rightarrow \quad 4\times 2-x\times(4)=9$

$\Rightarrow \quad 8-4x=9$

$\Rightarrow \quad -4x=9-8$

$\Rightarrow \quad -4x=1$

$\Rightarrow \quad x=\frac{-1}{4}$

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

$\Rightarrow \quad 5(p-1)=34-4$

$\Rightarrow \quad 5(p-1)=30$

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

$\Rightarrow \quad p-1=6$

$\Rightarrow \quad p=6+1$

$\Rightarrow \quad p=7$

(h) $34-5(p-1)=4$

$\Rightarrow \quad -5(p-1)=4-34$

$\Rightarrow \quad -5(p-1)=-30$

$$\Rightarrow \quad p-1=\frac{-30}{-5}$$
$$\Rightarrow \quad p-1=6$$
$$\Rightarrow \quad p=6+1$$
$$\Rightarrow \quad p=7$$

Question 3:

Solve the following equations:

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

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

(c) $-16=-5(2-p)$

(d) $10=4+3(t+2)$

(e) $28=4+3(t+5)$

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

Answer 3:

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

$$\Rightarrow \quad 4=5\times p-5\times 2$$
$$\Rightarrow \quad 4=5p-10$$
$$\Rightarrow \quad 5p-10=4$$
$$\Rightarrow \quad 5p=4+10$$
$$\Rightarrow \quad 5p=14$$
$$\Rightarrow \quad p=\frac{14}{5}$$

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

$$\Rightarrow \quad -4=5\times p-5\times 2$$
$$\Rightarrow \quad -4=5p-10$$
$$\Rightarrow \quad 5p-10=-4$$
$$\Rightarrow \quad 5p=-4+10$$
$$\Rightarrow \quad 5p=6$$
$$\Rightarrow \quad p=\frac{6}{5}$$

(c) $-16=-5(2-p)$

$\Rightarrow \quad -16=-5\times 2-(-5)\times p$

$\Rightarrow \quad -16=-10+5p$

$\Rightarrow \quad -10+5p=-16$

$\Rightarrow \quad 5p=-16+10$

$\Rightarrow \quad 5p=-6$

$\Rightarrow \quad p=\dfrac{-6}{5}$

(d) $10=4+3(t+2)$

$\Rightarrow \quad 10-4=3(t+2)$

$\Rightarrow \quad 6=3(t+2)$

$\Rightarrow \quad \dfrac{6}{3}=t+2$

$\Rightarrow \quad 2=t+2$

$\Rightarrow \quad 2-2=t$

$\Rightarrow \quad 0=t$

$\Rightarrow \quad t=0$

(e) $28=4+3(t+5)$

$\Rightarrow \quad 28-4=3(t+5)$

$\Rightarrow \quad 24=3(t+5)$

$\Rightarrow \quad \dfrac{24}{3}=t+5$

$\Rightarrow \quad 8=t+5$

$\Rightarrow \quad 8-5=t$

$\Rightarrow \quad 3=t$

$\Rightarrow \quad t=3$

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

$\Rightarrow \quad 0-16=4(m-6)$

$\Rightarrow \quad -16=4(m-6)$

$$\Rightarrow \quad \frac{-16}{4} = m - 6$$

$$\Rightarrow \quad -4 = m - 6$$

$$\Rightarrow \quad -4 + 6 = m$$

$$\Rightarrow \quad 2 = m$$

$$\Rightarrow \quad m = 2$$

Question 4:

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

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

Answer 4:

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

(i) $x = 2$

Multiplying both sides by 10,

$10x = 20$

Adding 2 both sides

$10x + 2 = 20 + 2 \;=\; 10x + 2 = 22$

(ii) $x = 2$

Multiplying both sides by 5

$5x = 10$

Subtracting 3 from both sides

$5x - 3 = 10 - 3 \;=\; 5x - 3 = 7$

(iii) $x = 2$

Dividing both sides by 5

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

(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

$3x + 7 = -6 + 7 \;=\; 3x + 7 = 1$

(iii) $x = -2$

Multiplying both sides by 3

$3x = -6$

Adding 10 to both sides

$3x + 10 = -6 + 10 \;=\; 3x + 10 = 4$

Exercise 4.4

Question 1:

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-fourth 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 divides the sum by 5, she will get 8.

(g) Answer thinks of a number. If he takes away 7 from $\frac{5}{2}$ of the number, the result is $\frac{11}{2}$.

Answer 1:

(a) Let the number be x.

According to the question, $8x+4=60$

$\Rightarrow \quad 8x=60-4$

$\Rightarrow \quad 8x=56$

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

$\Rightarrow \quad x=7$

(b) Let the number be y.

According to the question, $\frac{y}{5}-4=3$

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

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

$\Rightarrow \quad y=7\times 5$

$\Rightarrow \quad y=35$

(c) Let the number be z.

According to the question, $\frac{3}{4}z+3=21$

$\Rightarrow \quad \frac{3}{4}z=21-3$

$\Rightarrow \quad \frac{3}{4}z=18$

$\Rightarrow \quad 3z=18\times 4$

$\Rightarrow \quad 3z=72$

$\Rightarrow \quad z=\frac{72}{3}$

$\Rightarrow \quad z=24$

(d) Let the number be x.

According to the question, $2x-11=15$

$\Rightarrow \quad 2x=15+11$

$\Rightarrow \quad 2x=26$

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

$\Rightarrow \quad x=13$

(e) Let the number be m.

According to the question, $50-3m=8$

$\Rightarrow \quad -3m=8-50$

$\Rightarrow \quad -3m=-42$

$\Rightarrow \quad m=\frac{-42}{-3}$

$\Rightarrow \quad m=14$

(f) Let the number be n.

According to the question, $\frac{n+19}{5}=8$

$\Rightarrow \quad n+19=8\times 5$

$\Rightarrow \quad n+19=40$

$\Rightarrow \quad n=40-19$

$\Rightarrow \quad n=21$

(g) Let the number be x.

According to the question, $\frac{5}{2}x-7=\frac{11}{2}$

$\Rightarrow \quad \frac{5}{2}x=\frac{11}{2}+7$

$\Rightarrow \quad \frac{5}{2}x=\frac{11+14}{2}$

$\Rightarrow \quad \frac{5}{2}x=\frac{25}{2}$

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

$\Rightarrow \quad 5x=25$

$\Rightarrow \quad x=\frac{25}{5}$

$\Rightarrow \quad x=5$

Question 2:

Solve the following:

(a) The teacher tells the class that the highest marks obtained by a student in her class are 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?

Answer 2:

(a) Let the lowest marks be y.

According to the question, $2y+7=87$

$\Rightarrow \quad 2y=87-7$

$\Rightarrow \quad 2y=80$

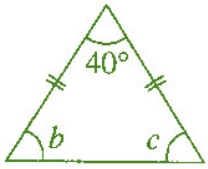
$\Rightarrow \quad y=\frac{80}{2}$

$\Rightarrow \quad y=40$

Thus, the lowest score is 40.

(b) Let the base angle of the triangle be b.

Given, $a = 40°, b = c$



Since, $a + b + c = 180°$ [Angle sum property of a triangle]

$\Rightarrow \quad 40° + b + b = 180°$

$\Rightarrow \quad 40° + 2b = 180°$

$\Rightarrow \quad 2b = 180° - 40°$

$\Rightarrow \quad 2b = 140°$

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

$\Rightarrow \quad b = 70°$

Thus, the base angles of the isosceles triangle are $70°$ each.

(c) Let the score of Rahul be x runs and Sachin's score is $2x$.

According to the question, $x + 2x = 198$

$\Rightarrow \quad 3x = 198$

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

$\Rightarrow \quad x = 66$

Thus, Rahul's score = 66 runs

And Sachin's score = 2 x 66 = 132 runs.

Question 3:

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

(iii) People of Sundergram planted a total of 102 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?

Answer 3:

(i) Let the number of marbles Parmit has be m.

According to the question, $5m+7=37$

$\Rightarrow \quad 5m=37-7$

$\Rightarrow \quad 5m=30$

$\Rightarrow \quad m=\frac{30}{5}$

$\Rightarrow \quad m=6$

Thus, Parmit has 6 marbles.

(ii) Let the age of Laxmi be y years.

Then her father's age = $(3y+4)$ years

According to question, $3y+4=49$

$\Rightarrow \quad 3y=49-4$

$\Rightarrow \quad 3y=45$

$\Rightarrow \quad y=\frac{45}{3}$

$\Rightarrow \quad y=15$

Thus, the age of Laxmi is 15 years.

(iii) Let the number of fruit trees be t.

Then the number of non-fruits tree = $3t+2$

According to the question, $t+3t+2=102$

$\Rightarrow \quad 4t+2=102$

$\Rightarrow \quad 4t=102-2$

$\Rightarrow \quad 4t=100$

$\Rightarrow \quad t=\frac{100}{4}$

$\Rightarrow \quad t=25$

Thus, the number of fruit trees are 25.

Question 4:

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!

Answer 4:

Let the number be n.

According to the question, $7n+50+40=300$

$\Rightarrow \quad 7n+90=300$

$\Rightarrow \quad 7n=300-90$

$\Rightarrow \quad 7n=210$

$\Rightarrow \quad n=\frac{210}{7}$

$\Rightarrow \quad n=30$

Thus, the required number is 30.