Simple Equations: Exercise 4.4

Q.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-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 5/2 of the number, the result is 23.

Sol:

(a) Given: Add 4 to eight times a number; you get 60.
Let x be the number.
So, $8x + 4 = 60$
On transposing 4 from LHS to RHS,
$8x = 60 - 4$
$8x = 56$
On dividing by 8 both the sides of equation,
$(8x/8) = (56/8)$
$x = 7$
Thus, $x = 7$, is the required solution of given equation.

(b) Given: One-fifth of a number minus 4 gives 3.
Let x be the number.
So, $(x/5) - 4 = 3$
On transposing - 4 from LHS to RHS,
$(x/5) = 3 + 4$
$(x/5) = 7$
On multiplying by 5 both the sides of equation,
$(x/5) \times 5 = 7 \times 5$
$x = 35$
Thus, $x = 5$, is the required solution of given equation.

(c) Given: If I take three-fourths of a number and add 3 to it, I get 21.
Let x be the number.
So, $(3/4)\, x + 3 = 21$
On transposing 3 from LHS to RHS,
$(3/4)\, x = 21 - 3$
$(3/4)\, x = 18$
On multiplying by 4 both the sides of equation,
$(3x/4) \times 4 = 18 \times 4$
$3x = 72$
On dividing by 3 both the sides of equation,
$(3x/3) = (72/3)$
$x = 24$
Thus, $x = 24$, is the required solution of given equation.

(d) Given: When I subtracted 11 from twice a number, the result was 15.
Let x be the number.

So, $2x - 11 = 15$
On transposing -11 from LHS to RHS,
$2x = 15 + 11$
$2x = 26$
On dividing by 2 both the sides of equation,
$(2x/2) = (26/2)$
$x = 13$
Thus, $x = 13$, is the required solution of given equation.

(e) Given: Munna subtracts thrice the number of notebooks he has from 50, he finds the result to be 8.
Let x be the number.
So, $50 - 3x = 8$
On transposing 50 from LHS to RHS,
$-3x = 8 - 50$
$-3x = -42$
On dividing by 3 both the sides of equation,
$(3x/3) = (42/3)$
$x = 14$
Thus, $x = 14$, is the required solution of given equation.

(f) Given: Ibenhal thinks of a number. If she adds 19 to it and divides the sum by 5, she will get 8.
Let x be the number.
So, $(x + 19)/5 = 8$
On multiplying by 5 both the sides of equation,
$\{(x + 19)/5\} \times 5 = 8 \times 5$
$(x + 19) = 40$
On transposing 19 from LHS to RHS,
$x = 40 - 19$
$x = 21$
Thus, $x = 21$, is the required solution of given equation.

(g) Given: Anwar thinks of a number. If he takes away 7 from 5/2 of the number, the result is 23.
Let x be the number.
So, $(5/2)\, x - 7 = 23$
On transposing -7 from LHS to RHS,
$(5/2)\, x = 23 + 7$
$(5/2)\, x = 30$
On multiplying by 2 both the sides of equation,
$(5x/2) \times 2 = 30 \times 2$
$5x = 60$
On dividing by 5 both the sides of equation,
$(5x/5) = 60/5$
$x = 12$
Thus, $x = 12$, is the required solution of given equation.

Q.2 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?

Sol:

(a) Given: The highest score is 87.

Let x be the lowest marks.

Since, the highest marks obtained by a student in her class is twice the lowest marks plus 7.

So, Highest score = highest marks scored by student = 2×Lowest scored marks + 7

$87 = 2x + 7$

On transposing 7 from RHS to LHS,

$87 - 7 = 2x$

$80 = 2x$

On dividing by 2 both the sides of equation,

$(80/2) = (2x/2)$

$40 = x$

$x = 40$

Thus, the lowest score = 40

(b) Given: The vertex angle = 40°

Let x be the base angle.

Vertex angle = 2 × base angle

Vertex angle = $2 \times x$

Since, the base angles are equal and the sum of three angles of a triangle is 180°.

So, $2x + 40^\circ = 180^\circ$

On transposing 40° from LHS to RHS,

$2x = 180^\circ - 40^\circ$

$2x = 140^\circ$

On dividing by 2 both the sides of equation,

$(2x/2) = (140^\circ/2)$

$x = 70^\circ$

Thus the base angle, $x = 70^\circ$

(c) Given: Since, Sachin and Rahul runs fell two short of a double century.

So, total run = 200 – 2 =198 run

Let x run be the run scored by Rahul.

Since, Sachin scored twice as many runs as Rahul.

So, Total score = Scored run by Rahul + Scored run by Sachin

$198 = x + 2x$

$198 = 3x$

On dividing by 3 both the sides of equation,

$(198/3) = (3x/3)$

$x = 66$

Thus, Rahul scored is 66 run and Sachin scored 2 x 66 = 132 runs.

Q.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 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?

Sol: **Given: (i) Given:** Irfan has 37 marbles.
Let m be the number of Parmit's marbles.
And Irfan has 7 marbles more than five times of Parmit's marbles.
So, total marbles Irfan having = 5 x Number of Parmit's marble + 7
$= 5 \times m + 7$
So, Equation: $5m + 7 = 37$
On transposing 7 from LHS to RHS,
$5m = 37 - 7$
$5m = 30$
On dividing by 5 both the sides of equation,
$(5m/5) = (30/5)$
$m = 6$
Thus, Parmit has marbles = 6 Marbles

(ii) Given: Laxmi's father is 49 years old.
Let y year be the age of Laxmi.
And Laxmi's father is 4 years older than three times Laxmi's age.
So, Laxmi's father age = 3 × Laxmi's age + 4
$= 3 \times y + 4$
Since, Laxmi's father is 49 years old.
So, Equation: $3y + 4 = 49$
On transposing 4 from LHS to RHS,
$3y = 49 - 4$
$3y = 45$
On dividing by 3 both the sides of equation,
$(3y/3) = (45/3)$
$y = 15$
Thus, Lakshmi's age = 15 years

(iii) Given: The number of non-fruit trees planted was 77.
Let x be the number of fruit trees.
Since, The number of non-fruit trees were two more than three times the number of fruit trees.
So, 3 × number of fruit trees + 2 = number of non-fruit trees
Equation: $3 \times x + 2 = 77$
$3x + 2 = 77$
On transposing 2 from LHS to RHS,
$3x = 77 - 2$
$3x = 75$
On dividing by 3 both the sides of equation,
$(3x/3) = 75/3$
$x = 25$
Thus, Number of fruit trees = 25 trees

Q.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!

Sol: Let x be the number.

According to riddle, number is seven times over and add a fifty,
So, $7x + 50$
Now, to reach a triple century you still need forty.
So, $7x + 50 + 40 = 300$

$7x + 90 = 300$

On transposing 90 from LHS to RHS,

$7x = 300 - 90$

$7x = 210$

On dividing by 7 both the sides of equation,

$(7x/7) = (210/7)$

$x = 30$

Thus, the number is 30.