

*** Questions With Calculation.[2 Marks Each]****[50]**

1. Frame an equation that has no solution.

[Hint: 4 more than a number, and 5 more than a number can never be equal!]

Ans. : Equation $u + 6 = u + 2$ has no solutionSubtract u from both sides

$$u + 6 - u = u + 2 - u$$

$$\Rightarrow 6 = 2, \text{ which is an incorrect statement.}$$

2. Find the value of each unknown:

$$2y = 60$$

Ans. : $2y = 60$

Divide both sides by 2

$$\frac{2y}{2} = \frac{60}{2}$$

$$\Rightarrow y = 30$$

3. Find the value of each unknown:

$$-8 = 5x - 3$$

Ans. : $-8 = 5x - 3$

Add 3 on both sides

$$-8 + 3 = 5x$$

$$\Rightarrow -5 = 5x$$

Divide both sides by 5

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

$$\Rightarrow -1 = x$$

4. Find the value of each unknown:

$$-53w = -15$$

Ans. : $-53w = -15$

Divide both sides by -53

$$\frac{-53w}{-53} = \frac{-15}{-53}$$

$$\Rightarrow w = \frac{15}{53}$$

5. Find the value of each unknown:

$$13 - z = 8$$

Ans. : $13 - z = 8$

Subtract 13 from both sides

$$13 - z - 13 = 8 - 13$$

$$\Rightarrow -z = -5$$

Divide both sides by -1



$$\frac{-z}{-1} = \frac{-5}{-1}$$
$$\Rightarrow z = +5$$

6. Find the value of each unknown:

$$k + 8 = 12 - k$$

Ans. : $k + 8 = 12 - k$

Add k on both sides

$$k + 8 + k = 12 - k + k$$

$$\Rightarrow 2k + 8 = 12$$

Subtract 8 from both sides

$$2k + 8 - 8 = 12 - 8$$

$$\Rightarrow -2k = 4$$

Divide both sides by 2

$$\frac{2k}{2} = \frac{4}{2}$$

$$\Rightarrow k = 2$$

7. Find the value of each unknown:

$$7m = m - 3$$

Ans. : $7m = m - 3$

Subtract m from both sides

$$7m - m = m - 3 - m$$

$$\Rightarrow 6m = -3$$

Divide both sides by 6

$$\frac{6m}{6} = \frac{-3}{6}$$

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

8. Find the value of each unknown:

$$3n = 10 + n$$

Ans. : $3n = 10 + n$

Subtract n from both sides

$$3n - n = 10 + n - n$$

$$\Rightarrow 2n = 10$$

Divide both sides by 2

$$\frac{2n}{2} = \frac{10}{2}$$

$$\Rightarrow n = 5$$

9. Fill in the blank with integer:

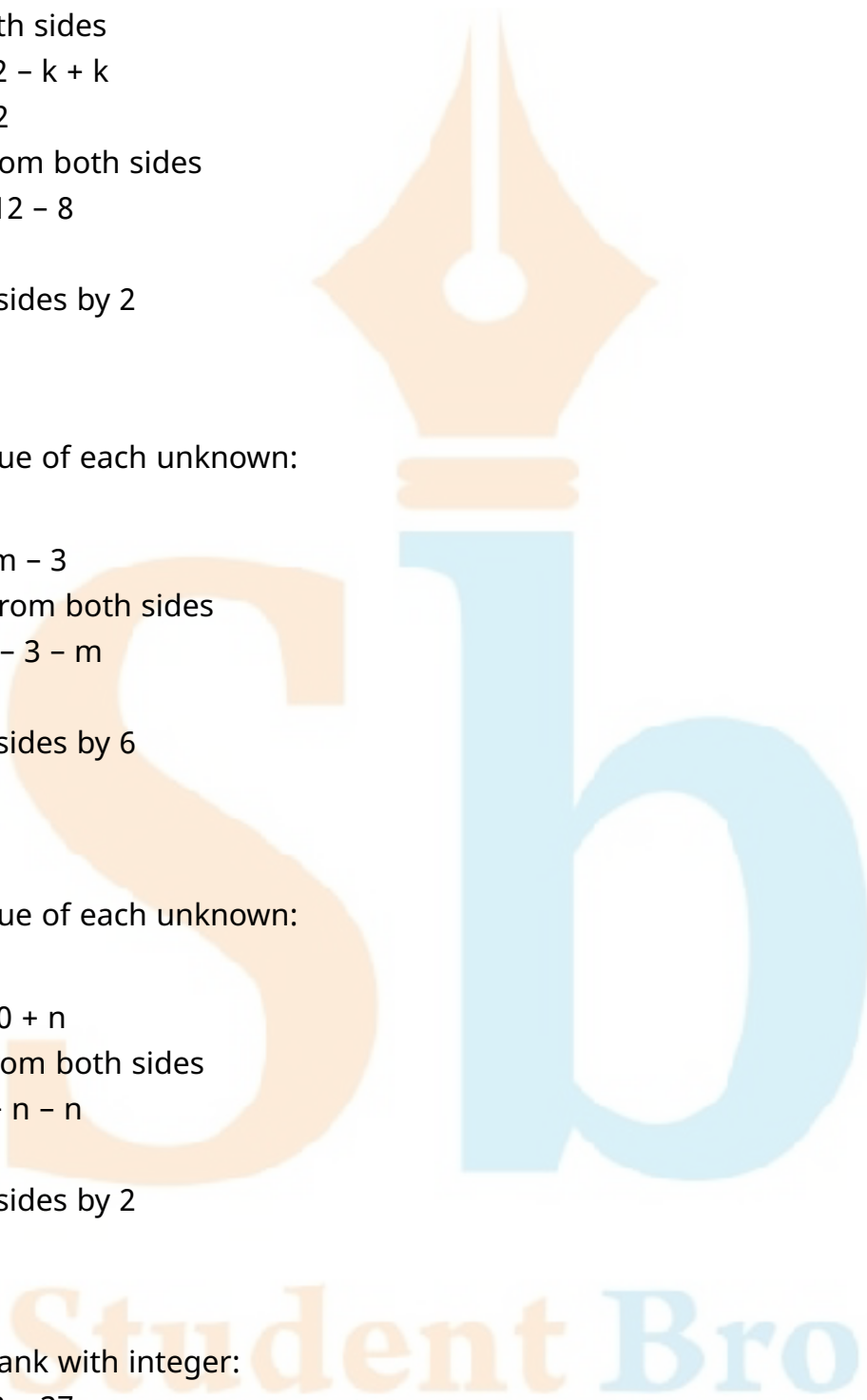
$$5 \times \underline{\quad} - 8 = 37$$

Ans. : Let unknown be x.

$$5 \times x - 8 = 37$$

$$\Rightarrow 5x - 8 = 37$$

$$\Rightarrow 5x = 37 + 8$$



$$\Rightarrow 5x = 45$$

$$\Rightarrow x = 45 \div 5$$

$$\Rightarrow x = 9$$

$$\therefore 5 \times 9 - 8 = 37$$

10. Fill in the blank with integer:

$$37 - (33 - \underline{\quad}) = 35$$

Ans. : Let unknown be x.

$$37 - (33 - x) = 35$$

$$\Rightarrow 37 - 33 + x = 35$$

$$\Rightarrow 4 + x = 35$$

$$\Rightarrow x = 35 - 4$$

$$\Rightarrow x = 31$$

$$\therefore 37 - (33 - 31) = 35$$

11. Fill in the blank with integer:

$$-3 \times (-11 + \underline{\quad}) = 45$$

Ans. : Let unknown be y.

$$-3 \times (-11 + y) = 45$$

$$\Rightarrow (-11 + y) = 45 \div (-3)$$

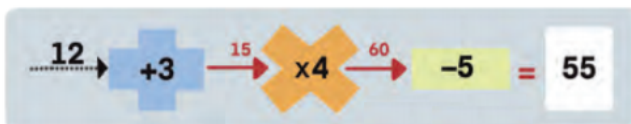
$$\Rightarrow -11 + y = -15$$

$$\Rightarrow y = -15 + 11$$

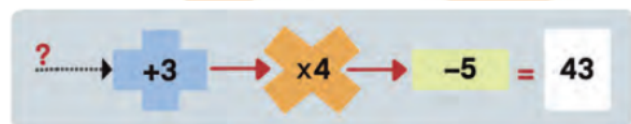
$$\Rightarrow y = -4$$

$$\therefore -3 \times (-11 + (-4)) = 45$$

12. Here are machines that take an input, perform an operation on it, and send out the result as an output.



Find the inputs in the following cases:



Ans. : (i) $\xrightarrow{(9)} +3 \xrightarrow{(12)} \times 4 \xrightarrow{(48)} -5 = 43$

(ii) $17 + 3 \xrightarrow{20} \times 4 \xrightarrow{80} -5 = 75$

13. A taxi driver charges a fixed fee of ₹ 800 per day plus ₹ 20 for each kilometer traveled. If the total cost for a taxi ride is ₹ 2200, determine the number of

kilometres traveled.

Ans. : Fixed charges by Taxi driver = ₹ 800

Charge per kilometer = ₹ 20

Let the distance covered be x km.

According to the question

$$x \times 20 + 800 = 2200$$

$$\Rightarrow 20x = 2200 - 800$$

$$\Rightarrow 20x = 1400$$

$$\Rightarrow x = 70$$

Total distance covered is 70 km.

14. The sum of two numbers is 76. One number is three times the other number. What are the numbers?

Ans. : Let the two numbers be x and $3x$.

According to the question

$$x + 3x = 76$$

$$\Rightarrow 4x = 76$$

$$\Rightarrow x = 19$$

The two numbers are 19 and 3×19 , i.e., 19 and 57.

15. The steps to solve equation are shown below. Identify and correct any mistakes:

$$6x + 9 = 66$$

$$x + 9 = 11$$

$$x = 11 - 9$$

$$x = 2$$

Ans. : $6x + 9 = 66 \rightarrow$ Error

Variable terms should be on one side and constants on the other side before separating the coefficient from the variable.

Correction

$$6x + 9 = 66$$

$$6x = 66 - 9$$

$$6x = 57$$

$$x = \frac{57}{6}$$

$$x = \frac{19}{2}$$

$$x = 9\frac{1}{2}$$

16. The steps to solve equation are shown below. Identify and correct any mistakes:

$$14y + 24 = 36$$

$$7y + 12 = 18$$

$$7y = 6$$

$$y = \frac{6}{7}$$



Ans. : $14y + 24 = 36$

$7y + 12 = 18$ [Dividing by 2 throughout]

$7y = 6$

$y = \frac{6}{7} \rightarrow$ No Error

17. A number increased by 36 is equal to ten times itself. What is the number?

Ans. : Let the number be x .

According to the question

$x + 36 = 10 \times x$

$\Rightarrow x + 36 = 10x$

$\Rightarrow 36 = 10x - x$

$\Rightarrow 36 = 9x$

$\Rightarrow 36 \div 9 = x$

$\Rightarrow 4 = x$

18. Solve these equation:

$5(r + 2) = 10$

Ans. : $5(r + 2) = 10$

$\Rightarrow 5 \times (r + 2) = 10$

$\Rightarrow (r + 2) = 10 \div 5$

$\Rightarrow r + 2 = 2$

$\Rightarrow r = 2 - 2$

$\Rightarrow r = 0$

19. Solve these equation:

$-3(u + 2) = 2(u - 1)$

Ans. : $-3(u + 2) = 2(u - 1)$

$\Rightarrow -3u - 6 = 2u - 2$

$\Rightarrow -3u - 2u = -2 + 6$

$\Rightarrow -5u = 4$

$\Rightarrow u = \frac{-4}{5}$

20. Solve these equation:

$2(7 - 2n) = -6$

Ans. : $2(7 - 2n) = -6$

$\Rightarrow 2 \times (7 - 2n) = -6$

$\Rightarrow 7 - 2n = -6 \div 2$

$\Rightarrow 7 - 2n = -3$

$\Rightarrow -2n = -3 - 7$

$\Rightarrow -2n = -10$

$\Rightarrow n = 5$

21. Solve these equation:

$2(x - 4) = -16$

Ans. : $2(x - 4) = -16$

$\Rightarrow x - 4 = -8$

$\Rightarrow x = -8 + 4$

$\Rightarrow x = -4$

22. Solve these equation:

$6(x - 1) = 2(x - 1) - 4$

Ans. : $6(x - 1) = 2(x - 1) - 4$ [Distributive property]

$\Rightarrow 6x - 6 = 2x - 2 - 4$

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

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

$\Rightarrow 4x = 0$

$\Rightarrow x = 0$

23. Solve these equation:

$3 - 7s = 7 - 3s$

Ans. : $3 - 7s = 7 - 3s$

$\Rightarrow 3 - 7 = -3s + 7s$

$\Rightarrow -4 = 4s$

$\Rightarrow s = -1$

24. Solve these equation:

$2x + 1 = 6 - (2x - 3)$

Ans. : $2x + 1 = 6 - (2x - 3)$

$\Rightarrow 2x + 1 = 6 - 2x + 3$

$\Rightarrow 2x + 2x = 6 + 3 - 1$

$\Rightarrow 4x = 8$

$\Rightarrow x = 2$

25. Solve these equation:

$10 - 5x = 3(x - 4) - 2(x - 7)$

Ans. : $10 - 5x = 3(x - 4) - 2(x - 7)$

$\Rightarrow 10 - 5x = 3x - 12 - 2x + 14$

$\Rightarrow 10 - 5x = 3x - 2x - 12 + 14$

$\Rightarrow 10 - 5x = x + 2$

$\Rightarrow 10 - 2 = x + 5x$

$\Rightarrow 8 = 6x$

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

* Questions With Calculation.[3 Marks Each]

[57]

26. Solve these equation and check the solution.

$3x - 10 = 35$

Ans. : $3x - 10 = 35$

Add 10 on both sides

$$3x - 10 + 10 = 35 + 10$$

$$\Rightarrow 3x = 45$$

Divide by 3 on both sides

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

$$\Rightarrow x = 15$$

Check:

$$\text{LHS} = 3x - 10 \text{ for } x = 15$$

$$= 3 \times 15 - 10$$

$$= 45 - 10$$

$$= 35$$

$$\text{LHS} = \text{RHS}$$

Hence checked.

27. Solve these equation and check the solution.

$$5s = 3s$$

Ans. : Bring unknown terms on one side by subtracting 3s

$$\Rightarrow 5s - 3s = 3s - 3s$$

$$\Rightarrow 2s = 0$$

Divide by 2 on both sides 2

$$\Rightarrow \frac{2s}{2} = \frac{0}{2}$$

$$\Rightarrow s = 0$$

Check:

$$\text{LHS} = 5s = 5 \times 0 = 0$$

$$\text{RHS} = 3s = 3 \times 0 = 0$$

$$\text{LHS} = \text{RHS}$$

Hence checked.

28. Solve these equation and check the solution.

$$3u - 7 = 2u + 3$$

Ans. : $3u - 7 = 2u + 3$

Bring the unknown terms to one side

By subtracting 2u from both sides

$$\Rightarrow 3u - 7 - 2u = 2u + 3 - 2u$$

$$\Rightarrow u - 7 = 3$$

Add 7 to both sides

$$\Rightarrow u - 7 + 7 = 3 + 7$$

$$\Rightarrow u = 10$$

Check: For $u = 10$

$$\text{LHS} = 3u - 7$$

$$= 3 \times 10 - 7$$

$$= 30 - 7$$

$$= 23$$

$$\text{RHS} = 2u + 3$$

$$= 2 \times 10 + 3$$

$$= 20 + 3$$

$$= 23$$

$$\text{LHS} = \text{RHS}$$

Hence checked.

29. Solve these equation and check the solution.

$$\frac{u}{15} = 6$$

$$\text{Ans. : } \frac{u}{15} = 6$$

Multiply both sides by 15

$$\frac{u}{15} \times 15 = 6 \times 15$$

$$\Rightarrow u = 90$$

Check:

$$\text{LHS} = \frac{u}{15}$$

$$\frac{90}{15} = 6$$

$$\text{RHS} = 6$$

$$\text{LHS} = \text{RHS}$$

Hence checked.

30. I am a 3-digit number. My hundred's digit is 3 less than my ten's digit. My ten's digit is 3 less than my unit's digit. The sum of all three digits is 15. Who am I?

Ans. : Let the ten's place digit be x .

Then hundred's place digit = $x - 3$

Unit's digit = $x + 3$

Sum of digits = 15

According to the question,

$$(x - 3) + x + (x + 3) = 15$$

$$\Rightarrow 3x = 15$$

Divide both sides by 3

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

$$\Rightarrow x = 5$$

Ten's digit = 5

Hundred's digit = $5 - 3 = 2$

Unit's digit = $5 + 3 = 8$

Number formed = 258

31. The weight of a brick is 1kg more than half its weight. What is the weight of the brick?

Ans. : Let the weight of a brick be x kg.

According to the question,

$$X = \frac{x}{2} + 1$$

Subtract $\frac{x}{2}$ from both sides

$$\frac{x}{1} - \frac{x}{2} = \frac{x}{2} + 1 - \frac{x}{2}$$

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

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

Multiply both sides by 2

$$\frac{x}{2} \times 2 = 1 \times 2$$

$$\Rightarrow x = 2$$

\therefore Weight of the brick = 2 kg

32. One quarter of a number increased by 9 gives the same number. What is the number?

Ans. : Let the number be x .

According to the question,

$$\frac{1}{4} \times x + 9 = x$$

$$\frac{x}{4} + 9 = x$$

Subtract $\frac{x}{4}$ from both sides

$$\frac{x}{4} + 9 - \frac{x}{4} = x - \frac{x}{4}$$

$$\Rightarrow 9 = \frac{4x-x}{4} \text{ [LCM of 1 and 4 = 4]}$$

$$\Rightarrow 9 = \frac{3x}{4}$$

Divide both sides by $\frac{3}{4}$

$$\Rightarrow 9 \div \frac{3}{4} = \frac{3x}{4} \div \frac{3}{4}$$

$$\Rightarrow 9 \times \frac{4}{3} = \frac{3x}{4} \times \frac{4}{3}$$

$$\Rightarrow 12 = x$$

The required number is 12.

33. Ranju is a daily wage labourer. She earns ₹ 750 a day. Her employer pays her in 50 and 100-rupee notes. If Ranju gets an equal number of 50 and 100 rupee notes, how many notes of each does she have?

Ans. : Let no. of ₹ 50 notes with Ranju be x .

Then no. of ₹ 100 notes with Ranju is also x .

Total money with Ranju = ₹ 750

According to the question,

Value of ₹ 50 notes = ₹ $50x$

Value of ₹ 100 notes = ₹ $100x$

$$\text{₹ } 50x + \text{₹ } 100x = \text{₹ } 750$$

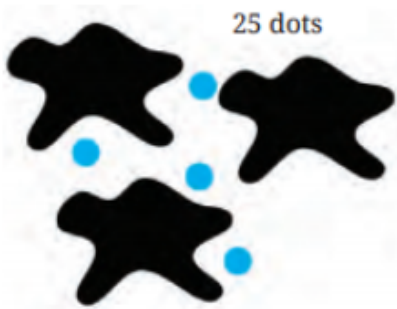
$$\Rightarrow 150x = 750$$

$$\Rightarrow x = 5$$

No. of notes of ₹ 50 is 5.

No. of notes of ₹ 100 is 5.

34. In the given picture, each black blob hides an equal number of blue dots. If there are 25 dots in total, how many dots are covered by one blob? Write an equation to describe this problem.



Ans. : Let each black blob hide the blue dots.

There are 3 black blobs and 4 blue dots in the picture.

We are given total blue dots = 25

According to the question,

$$3u + 4 = 25$$

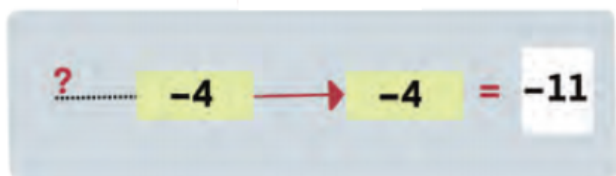
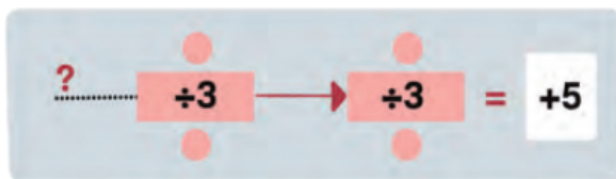
$$\Rightarrow 3u = 25 - 4$$

$$\Rightarrow 3u = 21$$

$$\Rightarrow u = 7$$

Each black blob hides 7 blue dots.

35. What are the inputs to these machines?



Ans. : (i) $\overset{45}{\longrightarrow} \div 3 \overset{15}{\longrightarrow} \div 3 = 5$

Let the unknown number be a.

$$(a \div 3) \div 3 = 5$$

$$\Rightarrow a \div 3 = 5 \times 3$$

$$\Rightarrow a \div 3 = 15$$

$$\Rightarrow a = 15 \times 3$$

$$\Rightarrow a = 45$$

The unknown number is 45.

(ii) $\overset{-3}{\longrightarrow} -4 \overset{-7}{\longrightarrow} -4 = -11$

Let the unknown number be b.

$$(b - 4) - 4 = -11$$



$$\Rightarrow b - 4 - 4 = -11$$

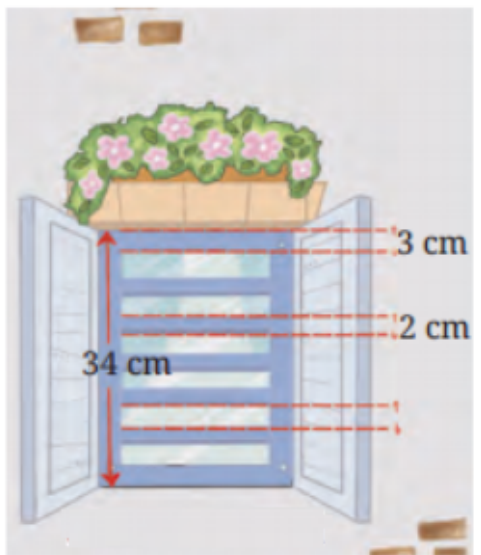
$$\Rightarrow b - 8 = -11$$

$$\Rightarrow b = -11 + 8$$

$$\Rightarrow b = -3$$

The unknown number is -3.

36. The figure shows the diagram for a window with a grill. What is the gap between the two rods in the grill?



Ans. : Total height of the window, including the frame = 34 cm

Total height of the window excluding the frame = 34 cm - 3 cm - 3 cm = 28 cm

Width of one rod of grill = 2 cm

No. of rods of the grill = 5

Total width of 5 rods = 5 × 2 cm = 10 cm

Let the height of 1 gap be x cm.

No. of gaps = 6

Total height of gaps = 6x

According to the question

$$10 + 6x = 28$$

$$\Rightarrow 6x = 28 - 10$$

$$\Rightarrow 6x = 18$$

$$\Rightarrow x = 3$$

Gap between two rods = 3 cm.

37. In a restaurant, a fruit juice costs ₹ 15 less than a chocolate milkshake. If 4 fruit juices and 7 chocolate milkshakes cost ₹ 600, find the cost of the fruit juice and milkshake.

Ans. : Let the cost of a chocolate milkshake be ₹ x.

Cost of fruit juice = ₹(x - 15)

Cost of 4 fruit juices and 7 chocolate milkshakes = ₹ 600

According to the question



$$4(x - 15) + 7x = 600$$

$$\Rightarrow 4x - 60 + 7x = 600$$

$$\Rightarrow 4x + 7x = 600 + 60$$

$$\Rightarrow 11x = 660$$

$$\Rightarrow x = 60$$

Cost of 1 chocolate milkshake = ₹ 60

Cost of 1 fruit juice = ₹ 60 - ₹ 15 = ₹ 45

38. Given $28p - 36 = 98$, find the value of $14p - 19$ and $28p - 38$.

Ans. : $28p - 36 = 98$

$$\Rightarrow 28p = 98 + 36$$

$$\Rightarrow 28p = 134$$

$$\Rightarrow p = \frac{134}{28}$$

$$\Rightarrow p = \frac{67}{14}$$

Now to find the value of

(i) $14p - 19 = 14 \times \frac{67}{14} - 19$

$$= 67 - 19$$

$$= 48$$

(ii) $28p - 38 = 28 \times \frac{67}{14} - 38$

$$= 134 - 38$$

$$= 96$$

39. The steps to solve equation are shown below. Identify and correct any mistakes:

$$4x - 5 = 9x + 8$$

$$4x = 9x + 8 - 5$$

$$4x = 9x + 3$$

$$4x - 9x = 3$$

$$-5x = 3$$

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

Ans. : $4x - 5 = 9x + 8$

$$4x = 9x + 8 - 5 \rightarrow \text{Error}$$

$$4x = 9x + 3$$

$$4x - 9x = 3$$

$$-5x = 3$$

$$x = \frac{-5}{3} \rightarrow \text{Error}$$

Correction

$$4x - 5 = 9x + 8$$

$$4x = 9x + 8 + 5$$

$$4x = 9x + 13$$

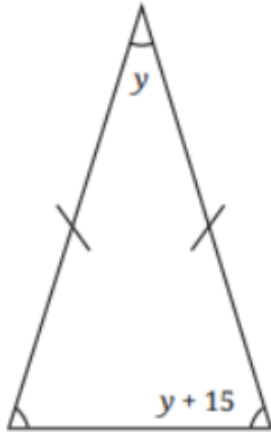
$$4x - 9x = 13$$

$$-5x = 13$$

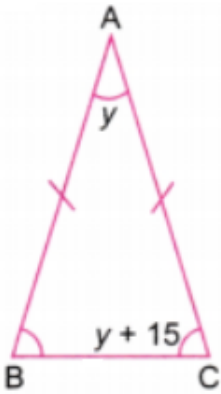
$$x = \frac{-13}{5}$$

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

40. Find the measure of the angle of these triangle:



Ans. : In $\triangle ABC$,



$AB = AC$ [Given]

$\angle B = \angle C$ [Angles opposite to equal sides in a triangle are equal]

So $\angle B = y + 15$

$\angle A + \angle B + \angle C = 180^\circ$ [Angle sum property of Δ]

$$\Rightarrow y + y + 15 + y + 15 = 180^\circ$$

$$\Rightarrow 3y + 30 = 180^\circ$$

$$\Rightarrow 3y = 180 - 30$$

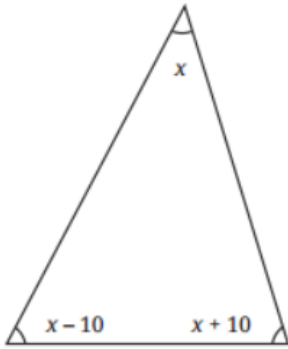
$$\Rightarrow 3y = 150$$

$$\Rightarrow y = 50$$

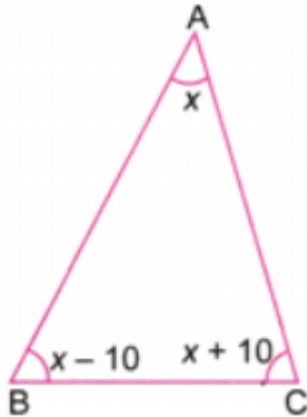
$$\angle A = 50^\circ, \angle B = 50^\circ + 15^\circ = 65^\circ, \text{ and } \angle C = 50^\circ + 15^\circ = 65^\circ$$

Student Bro

41. Find the measure of the angle of these triangle:



Ans. : In $\triangle ABC$,



$$\angle A + \angle B + \angle C = 180^\circ \text{ [Sum of angles of a triangle is } 180^\circ\text{]}$$

$$\Rightarrow x + x - 10 + x + 10 = 180^\circ$$

$$\Rightarrow 3x = 180^\circ$$

$$\Rightarrow x = 60^\circ$$

$$\angle A = 60^\circ, \angle B = 60^\circ - 10^\circ = 50^\circ \text{ and } \angle C = 60^\circ + 10^\circ = 70^\circ$$

42. The Bakhshali Manuscript (300 CE) mentions the following problem. The amount given to the first person is not known. The second person is given twice as much as the first. The third person is given thrice as much as the second, and the fourth person four times as much as the third. The total amount distributed is 132. What is the amount given to the first person?

Ans. : Let the amount given to the first person be x .

Amount given to second person = $2x$

Amount given to third person = $3(2x) = 6x$

Amount given to fourth person = $4(6x) = 24x$

Total amount = 132

$$\Rightarrow x + 2x + 6x + 24x = 132$$

$$\Rightarrow 33x = 132$$

$$\Rightarrow x = \frac{132}{33}$$

$$\Rightarrow x = 4$$

The amount given to the first person is 4.

43. The height of a giraffe is two and a half metres more than half its height. How tall is the giraffe?

Ans. : Let the height of a giraffe be x m.

According to the question

$$xm = 2\frac{1}{2}m + \frac{x}{2}m$$

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

$$\Rightarrow \frac{x}{1} - \frac{x}{2} = \frac{5}{2}$$

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

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

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

$$\Rightarrow x = 5$$

\therefore Height of the giraffe = 5 m.

44. There are some children and donkeys on a beach. Together they have 28 heads and 80 feet. How many donkeys are there? How many children are there?

Ans. : Let the number of children be x .

Let the number of donkeys be y .

$$x + y = 28$$

$$y = 28 - x \quad \dots\dots(i)$$

Children have 2 feet, but donkeys have 4 feet.

According to the question

$$2x + 4y = 80$$

$$\Rightarrow 2x + 4(28 - x) = 80 \text{ [From (i)]}$$

$$\Rightarrow 2x + 112 - 4x = 80$$

$$\Rightarrow -2x + 112 = 80$$

$$\Rightarrow -2x = 80 - 112$$

$$\Rightarrow -2x = -32$$

$$\Rightarrow x = 16$$

There are 16 children, and $(28 - 16) = 12$ donkeys.

*** Questions With Calculation.[5 Marks Each]**

[30]

45. Solve these equation and check the solution.

$$4(m + 6) - 8 = 2m - 4$$

Ans. : $4(m + 6) - 8 = 2m - 4$

Apply the distributive property

$$4m + 24 - 8 = 2m - 4$$

$$\Rightarrow 4m + 16 = 2m - 4$$

Subtract $2m$ from both sides

$$4m + 16 - 2m = 2m - 4 - 2m$$

$$\Rightarrow 2m + 16 = -4$$

Subtract 16 from both sides

$$2m + 16 - 16 = -4 - 16$$

$$\Rightarrow 2m = -20$$

Divide by 2 on both sides

$$2m \div 2 = -20 \div 2$$

$$\Rightarrow m = -10$$

Check:

$$\text{LHS} = 4(m + 6) - 8$$

$$= 4(-10 + 6) - 8$$

$$= 4(-4) - 8$$

$$= -16 - 8$$

$$= -24$$

$$\text{RHS} = 2m - 4$$

$$= 2(-10) - 4$$

$$= -20 - 4$$

$$= -24$$

$$\text{LHS} = \text{RHS}$$

Hence checked.

46. Write 5 equations whose solution is $x = -2$.

Ans. : (i) $x = -2$

Add 3 on both sides

$$x + 3 = -2 + 3$$

$$\Rightarrow x + 3 = 1$$

Multiply both sides by 2

$$2(x + 3) = 2$$

(ii) $x = -2$

Multiply both sides by 3

$$3x = -6$$

Add 2 on both sides

$$3x + 2 = -6 + 2$$

$$\Rightarrow 3x + 2 = -4$$

(iii) $x = -2$

Divide both sides by 4

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

$$\frac{x}{4} = -\frac{1}{2}$$

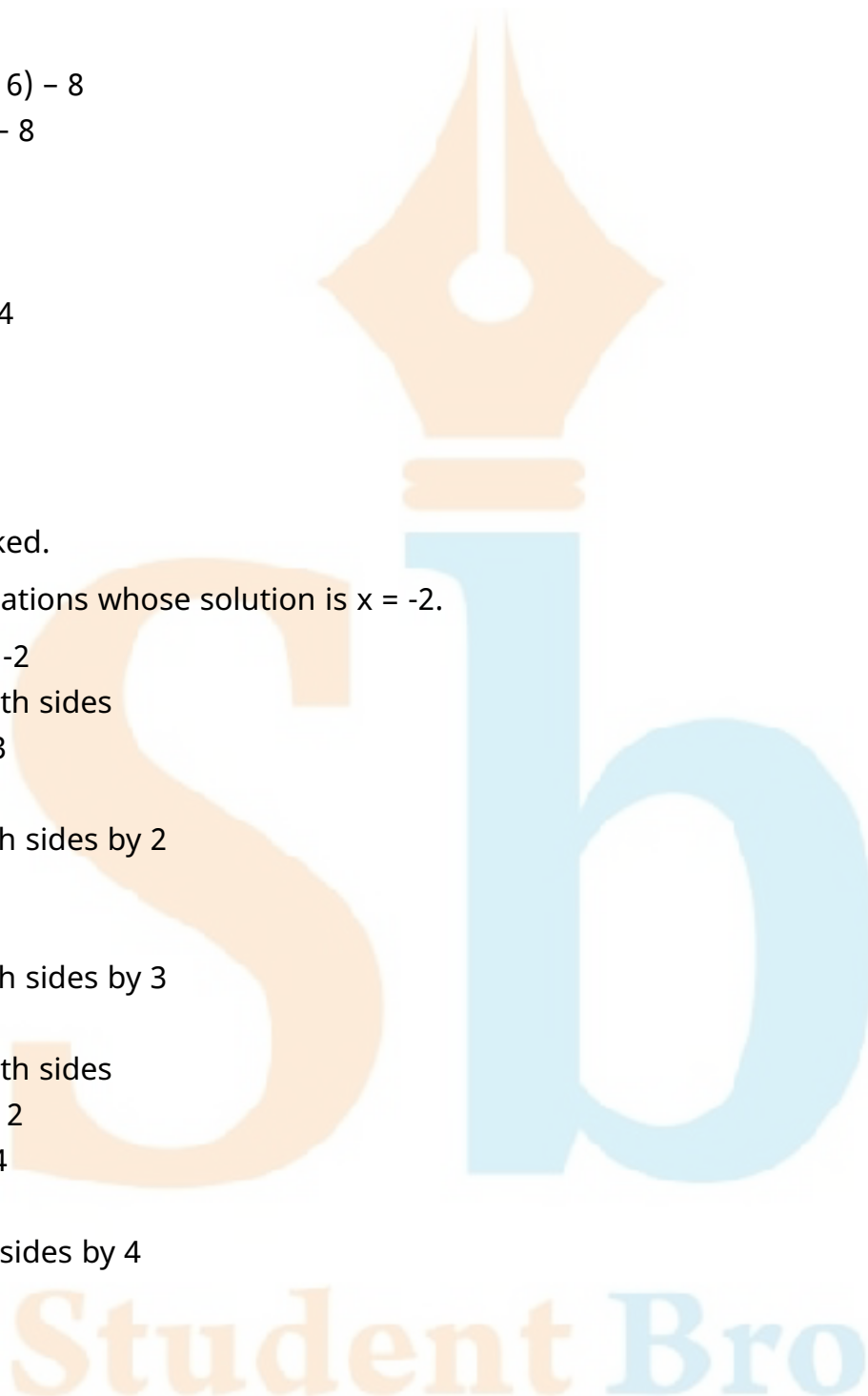
(iv) $x = -2$

Multiply both sides by 5

$$5x = -10$$

Add 12 on both sides

$$5x + 12 = -10 + 12$$



$$\Rightarrow 5x + 12 = 2$$

$$(v) x = -2$$

Subtract 7 from both sides

$$x - 7 = -2 - 7$$

$$x - 7 = -9$$

47. Given $4k + 1 = 13$, find the values of:

(a) $8k + 2$

(b) $4k$

(c) k

(d) $4k - 1$

(e) $-k - 2$

Ans. : $4k + 1 = 13$

Subtract 1 from both sides

$$4k + 1 - 1 = 13 - 1$$

$$\Rightarrow 4k = 12$$

Divide both sides by 4

$$4k \div 4 = 12 \div 4$$

$$\Rightarrow k = 3$$

(a) $8k + 2 = 8(3) + 2$

$$= 24 + 2$$

$$= 26$$

(b) $4k = 4 \times 3 = 12$

(c) $k = 3$

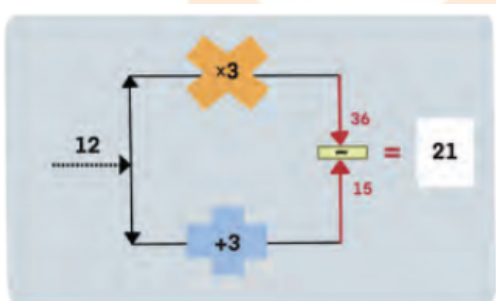
(d) $4k - 1 = 4(3) - 1$

$$= 12 - 1$$

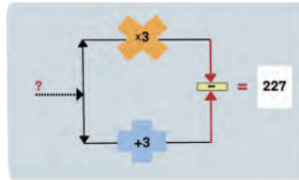
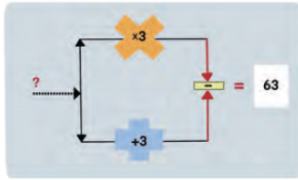
$$= 11$$

(e) $-k - 2 = -3 - 2 = -5$

48. Here are machines that take an input, perform an operation on it, and send out the result as an output.



Find the inputs in the following cases:



Ans. : (i) Let the unknown number be x .

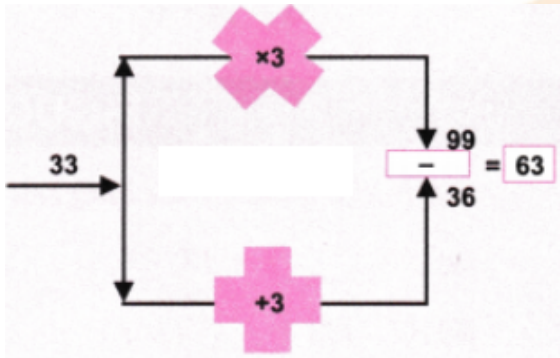
$$x \times 3 - (x + 3) = 63$$

$$\Rightarrow 3x - x - 3 = 63$$

$$\Rightarrow 2x - 3 = 63$$

$$\Rightarrow 2x = 66$$

$$\Rightarrow x = 33$$



(ii) Let the unknown number be y .

$$y \times 3 - (y + 3) = 227$$

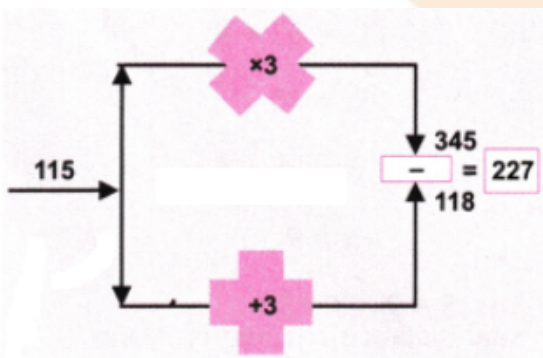
$$\Rightarrow 3y - y - 3 = 227$$

$$\Rightarrow 2y = 227 + 3$$

$$\Rightarrow 2y = 230$$

$$\Rightarrow y = 115$$

The unknown number is 115.



49. Write 4 equations whose solution is $u = 6$.

Ans. : (i) $u = 6$

Multiply both sides by $\frac{2}{3}$

$$\Rightarrow \frac{2}{3}u = \frac{2}{3} \times 6$$

$$\Rightarrow \frac{2}{3}u = 4$$

(ii) $u = 6$

Add 7 to both sides $u + 7 = 6 + 7$

$$\Rightarrow u + 1 = 13$$

(iii) $u = 6$

Multiply both sides by 2

$$2u = 12$$

Add 3 to both sides

$$\Rightarrow 2u + 3 = 12 + 3$$

$$\Rightarrow 2u + 3 = 15$$

(iv) $u = 6$

Multiply both sides by 3

$$3u = 18$$

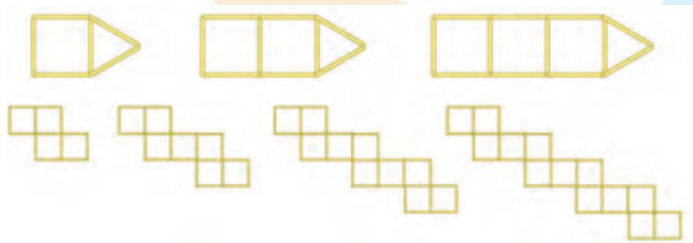
Subtract 5 from both sides

$$3u - 5 = 18 - 5$$

$$\Rightarrow 3u - 5 = 13$$

50. Two separate figures are given below. Each figure shows the first few positions in a sequence of arrangements made with sticks. Identify the pattern and answer the following questions for each figure:

- (a) How many squares are in position number 11 of the sequence?
- (b) How many sticks are needed to arrange position number 11 of the sequence?
- (c) Can an arrangement in this sequence be made using exactly 85 sticks? If yes, which position number will it correspond to?
- (d) Can an arrangement in this sequence be made using exactly 150 sticks? If yes, which position number will it correspond to?



Ans. :

(a)

4 squares	7 squares	10 squares
$1 + 3$	$1 + 3 + 3$	$1 + 3 + 3 + 3$ and so on.
$1 + \underline{1} \times 3$	$1 + \underline{2} \times 3$	$1 + \underline{3} \times 3 \quad \dots \quad 1 + \underline{x} \times 3$

No. of squares in 11th position will be
 $1 + 11 \times 3 = 1 + 33 = 34$

(b)

$13 + 9 \times 0$	$13 + 9 \times 1$	$13 + 9 \times 2$
and so on.		

So, no. of sticks needed in 11th position will be $13 + 9 \times 10 = 103$

(c) Let the nth arrangement have 85 sticks.

$$13 + (n - 1) \times 9 = 85$$

$$\Rightarrow 13 + 9n - 9 = 85$$

$$\Rightarrow 4 + 9n = 85$$

$$\Rightarrow 9n = 85 - 4$$

$$\Rightarrow 9n = 81$$

$$\Rightarrow n = 9$$

Yes, the arrangement will have 85 sticks.

(d) Let the n th arrangement have 150 sticks.

$$13 + (n - 1) \times 9 = 150$$

$$\Rightarrow 13 + 9n - 9 = 150$$

$$\Rightarrow 4 + 9n = 150$$

$$\Rightarrow 9n = 150 - 4$$

$$\Rightarrow 9n = 146$$

$$\Rightarrow n = \frac{146}{9}$$

$$\Rightarrow n = 16\frac{2}{9}$$

It is not a whole number.

So, no arrangement can be made with 150 sticks.

