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CHAPTER - 4

SIMPLE EQUATION

MODULE - $\frac{1}{2}$

CLASS - 7

INTRODUCTION:

- Before learning simple equation we should know about the constant number and variable.
- Constant number: The number which has a fixed value is called a constant. It has the same value everywhere and in any situation.
- For example- 0, 1, 2, 3, 4, -----

- Variable: The number which has different numerical values depending upon the situation is called a variable.
- Generally variables are represented by using the English alphabets like- k,l,m,n,p ,q,r,s,t,x,y,z etc.

- Sometimes we play the mind reader, like, Ashu asks her friend Raman to think a number, multiply the number by 2 and add 5 with the product. Now Ashu asks Raman what is his result? Raman says the result is 25. Ashu tells that the number you have thought is 10. Raman says yes it is 10.

- Now the question is how Ashu gets the answer. Ashu has applied the knowledge of equation.
- She frames the equation like $2x + 5 = 25$.
- Now we shall learn about the equation

EQUATION

- Equation is a statement of equality consisting of one or more variable(s) and it holds true for certain value of the variable.
- Example: $x - 5 = 10$

- An equation has two sides like, left hand side (LHS) and right hand side (RHS)
- Here $LHS = x - 5$ and $RHS = 10$

- WRITING THE STATEMENT IN THE FORM OF EQUATION:
- For this purpose we consider a variable for the unknown number and use the sign of fundamental operation of Mathematics.
- Example:
- (a) Twice (two times or double) of a number is 78.
- Let the number is x
- So, $2x = 78$

- (b) Thrice (three times) of a number is 34.
 - Let the number is y
 - $3y = 34$
- (c) The difference of five times of a number and 11 is 28.
 - Let the number is x
 - $5x - 11 = 28$

8 (d) One - fourth of a number minus 8 is 18

⦿ Let the number is y

⦿ $\frac{1}{4}y - 8 = 18$

⦿ (e) If you add 10 to 5 times of a number, you get 24

⦿ Let the number is y

⦿ $5y + 10 = 24$

○ (f) If one fifth of x is 4 more than 9.

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$$\frac{1}{5}x - 9 = 4$$

or
$$\frac{1}{5}x = 4 + 9 = 13$$

○ (g) Half of a number plus 8 is 18.

○ Let the number is x

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$$\frac{1}{2}x + 8 = 18.$$

Write a statement for the following equations:

(a) $2x - 5 = 15$

Subtracting 5 from twice of a number is 15.

(b) $\frac{3}{2}x + 7 = 5$

The sum of 7 and half of three times a number is 5.

(c) $2y - 3 = 7$

Taking away 3 from twice of a number is 7.

- **SOLUTION OF AN EQUATION**
- The value of the variable involved with the equation which satisfies the equation is called its solution.
- Note: satisfying the equation means, the value of the variable for which $LHS = RHS$.

- Example- $x + 3 = 5$, here if you take $x=1$, then $LHS = 1 + 3 = 4$, but $RHS = 5$, so $x = 1$ does not satisfy the equation.
If we take $x = 2$ then $LHS = 2 + 3 = 5$, and $RHS = 5$, so $LHS = RHS$, so $x = 2$ satisfies the equation. So the solution of this equation is 2.

RULES FOR FINDING THE SOLUTION

- (a) Transposition- Moving a number from one side to another side. On transposition of a number from one side to another side the sign of the number changes. Such that $+$ to $-$, $-$ to $+$, \times to \div and \div to \times .
- (b) When we (i) add the same number to both sides (ii) subtract the same number from both sides

(iii) Multiply the same number to both sides. (iv) divide the same number to both sides .then the equation does not change.

Example: (i) $x + 7 = 10$,

To separate the variable, here 7 is transposed from left to right, so its positive sign become negative

$$x = 10 - 7 = 3,$$

$x + 7 = 10$, To separate the variable, we have to subtract 7 from both the sides.

$$\text{So, } x + 7 - 7 = 10 - 7, \text{ or } x = 3$$

○ (ii) $4y - 5 = 7$

○ To separate the variable ,here we first transpose 5 from left to right side

○ So, $4y = 7 + 5 = 12$

○ Then we transpose 4 from left to right side

○ $Y = 12 \div 4 = 3$

8 (iii) $\frac{x}{5} = 7$

○ To separate the variable, here we have to transpose 5 from left to right side.

○ $X = 7 \times 5 = 35$

○ (iv) $\frac{-2x}{5} = 4$

○ $-2x = 4 \times 5 = 20 ; \quad x = \frac{20}{-2} :$

$x = -10$

○ (v) $\frac{4n}{3} - 5 = 15$

○ $\frac{4n}{3} = 15 + 5 = 20$

○ $4n = 20 \times 3 = 60$

○ $n = \frac{60}{4} = 15$

WHAT WE HAVE LEARNT

- (i) Constant and Variable.
- (ii) Concept of equation.
- (iii) Solution of the equation.
- (iv) Rule to solve the equation.

○ **ASSIGNMENT:**

- 1. Fill in the blanks-
- (i) Value of the variable which makes the equation a true statement is known as -----.
- (ii) If the LHS and RHS of an equation are interchanged, then the equation remains -----.

- (iii) Movement of number from one side to another side of an equation is called -----.
- (iv) If the same quantity is added to both sides of an equation, then the equation remains -----.
- (v) The solution of the equation $2x + 5 = 15$ is -----.

- 2. Write the equations of the following statements:
- a. The sum of half of a number and 3 is 16.
- b. 6 is subtracted from thrice of a number is 15.

3. Write the statement of the following equations:

a. $3y + 5 = 8$

b. $\frac{1}{2}x - 3 = 5$

○ 2. Solve the following equation:

○ a. $x - 4 = 5$

○ b. $y + 6 = 7$

○ c. $8x = 56$

o d. $\frac{m}{6} = 7$

o e. $4x - 2 = 6$

o f. $5q + 9 = 19$

o g. $5y + 15 = 0$