Basic Mathematical Term's

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Here we define some mathematical term's.

Number:

Number is a symbol which represents the amount of anything.

Example: 0, 1, 2, 3, etc.

Quantity:

Quantity is the amount of anything which is measured or counted.

Example: 1 Dozen = 12 things

Constant:

That quantity whose value always remain same is called Constant.

Example: 2, 3, 4, etc

Variable:

That quantity whose value can be changed, is called variable.

Example: x, y, z, etc.

Algebric Terms:

The terms of the form 2x, 3x, 4xy, etc are called Algebric terms.

Algebric Expression:

The sum of two or more algebric terms is called algebric expression.

Example: $2x+3y$, $x+y+z$, etc.

Equation:

An algebric expression including the equality symbol "=" is called an equation

Example: $2x+3y=0$ etc

Conditional Equation:

An equation which is true for particular value of the variable is called conditional equation

Example: $2x+1=0$, $2x+y=0$ etc.

Identity:

An equation which is true for all possible values of the variable, is called identity.

Example: $(a+b)x = ax+bx$ etc.

Polynomial:

An algebric expression in which the power of each variable involved is positive integer, called polynomial.

Example: x^2+3x

$2x^2-5x^2+x+3$ etc

Algebric Fraction:

The fraction in which both the numerator and denominator are algebric expression is called algebric fraction.

Linear Equation

Def: linear equation is an algebric expression involving variables where, the heighest power of the variable is one.

Simply put, Linear equation

i) at least one variable

ii) heighest power of the variable is 1.

iii) an equality sign.

Example:

$$3x - 5 = 4$$

Formation of Linear Equation

Sum of twice of number and 3.

Let us consider a number $= x$

twice of a number $= 2x$

Hence

$$2x + 3$$

which is called expression.

Sum : + (Binary operation)

number: x, y, (variable)

twice: $=$

Twice of a number increased by 3 is 17.

$2x + 3 = 17$

number : x
increased : $+$
is : $=$

Solution of L.E in One Variable

One Variable : ?

E.g:-

$2x + 5x + 11 = 0$

$2x + 7 = 0$

$9y + 3y + 11 = 0$

$$\underbrace{2x + 5x + 11}_{L.H.S} = \underbrace{0}_{R.H.S}$$

Those fixed values of variable for which L.H.S = R.H.S is called solution of equation.

How to find Solution:

We assumed that two sides of eq'n are balanced. We then performed the same mathematical operations on both sides of equation, so, that balance is not disturb.

For Example

$2x + 3 = 7$

Sol: Subtract 3 from both sides.

$2x + 3 - 3 = 7 - 3$

$2x = 4$

Divide both sides by 2

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

$x = 2$

Q#1

$2x - 3 = 7$

Sol

$2x = 7 + 3$

$2x = 10$

$x = 10/2$

$x = 5$

Q#2

$2y + 9 = 4$

Sol

$2y = 4 - 9$

$2y = -5$

$y = -5/2$

Q#3

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

Sol

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

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

$\frac{x}{3} = -\frac{8}{2}$

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

$x = -4 \times 3$

$x = -12$

Q#4

$\frac{15}{4} - 7x = 9$

Sol

$-7x = 9 - \frac{15}{4}$

$= \frac{36-15}{4}$

$-7x = \frac{21}{4}$

$x = \frac{21}{4 \times (-7)} = -\frac{21}{28} = \frac{-3}{4}$

Sign

$+ = -$

$- = +$

$\times = \div$

$\div = \times$

Q#5

$x - 6 = 4$

$x - 6 + 6 = 4 + 6$ (Add 6 on both sides)

Sol

$x = 10$

Q#6

$2x + 3 = 5/2$

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

Sol (Subtract 3 on both sides)

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

$2x = \frac{5-6}{2}$

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

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

(Divide 2 on both sides)

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

Q#7

$\frac{2}{3}(x-1) = \frac{1}{3}$

Sol $\frac{2}{3} \times 3(x-1) = \frac{1}{3} \times 3$ ($\times$ 3 on b.s)

$2(x-1) = 1$

$\frac{2}{2}(x-1) = \frac{1}{2}$ ($\div$ 2 on b.s)

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

$x - 1 + 1 = \frac{1}{2} + 1$ (Adding '1' on b.s)

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

$x = 3/2$

Linear Equation When Variable on Both sides

Q#1

Sol

$3x - 1 = 4x + 7$

$3x - 4x - 1 = 4x - 4x + 7$

We subtracted $4x$ on both sides

$-x - 1 = 7$

$-x - 1 + 1 = 7 + 1$ (Adding 1 on b.s)

$-x = 8$

$-(-x) = -(8)$ ($\times$ by (-) on b.s)

$x = -8$

Q#2

Method-I

Sol

$5x + 4 = x - 2$

$5x - x = -2 - 4$

$4x = -6$

$x = -6/4$

$x = -3/2$

Method-II

$5x + 4 = x - 2$

$5x - x + 4 = x - x - 2$

($-x$ on b.s)

$4x + 4 = -2$

$4x + 4 - 4 = -2 - 4$

$-$ '4' on b.s

$4x = -6$

$\frac{4x}{4} = -\frac{6}{4}$

$\div$ 4 b.s

$x = -3/2$

Question

If you subtract $\frac{1}{2}$ from a number and multiply the result by $\frac{1}{2}$, you get $\frac{1}{8}$ What is the number.

Let the number $= x$

Sol

$$\frac{1}{2}\left(x - \frac{1}{2}\right) = \frac{1}{8}$$

$$\frac{x}{2} - \frac{1}{4} = \frac{1}{8}$$

$$\frac{2x - 1}{4} = \frac{1}{8} \Rightarrow 2x - 1 = \frac{1}{8} \times 4$$

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

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

$$2x = \frac{3}{2} \Rightarrow x = \frac{3}{2 \times 2} = \frac{3}{4}$$

Question

Sum of two number is 95. If one exceed the other by 15, Find the number.

Let the First number $= x$

Sol " " Second $= x + 15$

Sum $= x + x + 15$

$95 = x + x + 15$

$$2x + 15 = 95$$

$$2x = 95 - 15 \Rightarrow 2x = 80$$

$$2x = 80 \Rightarrow x = \frac{80}{2} = 40$$

$$x = 40$$

Question

Solve and check the result.

$$3x = 2x + 18$$

$$3x - 2x = 18 \Rightarrow x = 18$$

Sol

$$L.H.S = 3x$$
$$= 3(18) \quad \text{Put } x = 18$$
$$= 54$$

$$R.H.S = 2x + 18$$
$$= 2(18) + 18 \quad \text{Put } x = 18$$
$$= 36 + 18$$
$$= 54$$

Question

Amina thinks of a number and subtract $\frac{5}{2}$ from it. She multiply the result by 8. The result now obtained is 3 times the same number she thought of what is the number.

Sol

Let the no be x

$$8\left(x - \frac{5}{2}\right) = 3x$$

$$8x - \frac{40}{2} = 3x$$

$$8x - 20 = 3x$$

$$8x - 3x = 20$$

$$5x = 20$$

$$x = 20/5$$

$$x = 4$$