

SIMPLIFICATION

Helping Hands:

1. Digits - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

2. Types of numbers.

(i) Natural numbers. = {1, 2, 3, 4,}

(ii) Whole numbers = {0, 1, 2, 3, 4.....}

(iii) Integers = {..., -3, -2, -1, 0, 1, 2, 3,}

(iv) Real numbers = {..., 2.8, -2, -10, 1, 1.9, -2, 3, 3.12, 3.13.....}

(v) Even numbers = {2, 4, 6,}

(vi) Odd numbers = {1, 3, 5, 7.....}

(vii) Prime numbers = {2, 3, 5, 7, 11, 13, 17, 19, -.....}

3.

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$a^2 - b^2 = (a+b)(a-b)$$

$$(a+b)^3 = a^3 + b^3 + 3ab(a+b)$$

$$(a-b)^3 = a^3 - b^3 - 3ab(a-b)$$

$$a^3 + b^3 = (a+b)(a^2 + b^2 - ab)$$

$$a^3 - b^3 = (a-b)(a^2 + b^2 + ab)$$

ADDITION & SUBTRACTION

Ex-1. ? = 8+88+888+8888+88888

$$? = 8(1+11+111+1111+11111)$$

$$? = 8(12345) \Rightarrow 98760$$

Ex-2. ? = 0.8 + 0.88 + 0.888 + 0.8888 + 0.88888

$$? = 8(0.1+0.11+0.111+0.1111+0.11111)$$

$$? = 8(0.54321)$$

$$\Rightarrow 4.34568$$

Ex-3. $8.8 + 8.88 + 8.888 + 8.8888 + 8.88888 = ?$

First, we can calculate decimal number and then whole no.

From Ex-2.

$$8(0.54321) = 4.34568$$

$$\text{and } 8+8+8+8+8 \text{ i.e., } 8 \times 5 = 40$$

$$\text{Therefore, } 40 + 4.34568 = 44.34568$$

Ex-4. $8456 + 3891 + 4560 = ?$

$$= 16907$$

Ex-5. $3.981 + 14.34 + 12.5 = ?$

First, we can balance the number of decimal digits and then use the elimination method.

$$\text{i.e., } 3.981 + 14.340 + 12.500 = ?$$

$$= 30.821$$

MULTIPLICATION

Some Special Types

1. When the sum of the unit digit is 10 and the remaining digit is same.

Example- 43×47

$$= 4 \times (4+1) / 3 \times 7$$

$$= 4 \times 5 / 21$$

$$= 20 / 21$$

$$\text{Ans} = 2021.$$

2. When sum of tens digit is 10 and unit digit is same

Example- 46×66

$$= (4 \times 6) + 6 / 6 \times 6$$

$$= 24 + 6 / 36$$

$$= 30 / 36$$

$$\text{Ans} = 3036$$

3. When the unit digit is 5 in both the numbers and difference between each number is 10.

Example- 75×65

$$= 6 \times (7 + 1) / 75$$

$$= 48 / 75$$

$$\text{Ans} = 4875$$

SQUARE AND SQUARE ROOTS

Learn Square of 1 to 50

Square of 1-50 numbers

$$1^2 = 1$$

$$2^2 = 4$$

$$3^2 = 9$$

$$4^2 = 16 \dots\dots\dots 50^2 = 2500$$

Type-I. Formula Method We know that

$$(a + b)^2 = a^2 + 2ab + b^2 \text{ i.e. } (a/b)^2 = a^2 / 2ab / b^2$$

Ex-1. $(5/6)^2$

$$= (5/6)^2$$

$$= 5^2 / 2 \times 5 \times 6 / 6^2$$

$$= \overset{6}{\swarrow} 25 / \overset{3}{\searrow} 60 / \overset{3}{\swarrow} 36$$

$$= 31 / 3 / 6$$

$$= 3136$$

We break number in two parts i.e., 5 & 6 and follow the rule of $(a+b)^2 = a^2 / 2ab / b^2$

CUBE & CUBE ROOT

Learn cubes from 1 to 25.

FRACTIONS

Fraction is known as a fraction in which a is called numerator and b is called denominator.

Types of Fractions:

I. Proper Fraction: If the numerator part of a fraction is less than the denominator then the fraction is called proper fraction and proper fraction is always less than 1.

II. Improper fraction: If the numerator of a fraction is greater than denominator then the fraction is called improper fraction. Improper fraction is always greater than 1.

$$\frac{5}{4}, \frac{3}{2}, \frac{7}{5}, \frac{11}{8} \dots \text{etc.}$$

III. Mixed Fraction: Mixed with proper fraction: When a proper fraction is mixed with a whole number known as mixed with proper fraction.

e.g., $8\frac{7}{2}$

VBODMAS RULE

V – Vinculum means bar as (-)

B – Bracket- () { } and then []

O – of

D – Division [$\div$]

M – Multiplication [$\times$]

A – Addition [$+$]

S – Subtraction [$-$]

The word 'VBODMAS' represents the order of calculation i.e., order of signs

B	O	D	M	A	S
Brackets	Orders	Divide	Multiply	Add	Subtract

Example 1: $35 \div 7 \times 5 = ?$

Solution:

According to the order of VBODMAS, first we solve division and then multiplication

i.e., $35 \div 7 \times 5 = ?$

$$5 \times 5 = ?$$

$$? = 25$$

Example 2: $35 \div 5 \text{ of } 7 = ?$

Solution:

According to the order of VBODMAS, first we solve 'of' and then division.

i.e., $35 \div 5$ of $7 = ?$

$35 \div 35 = ?$

$? = 1$

Example 3: $48 \div 12$ of $2 + [3 + 17 \times 2] = ?$

Solution:

$48 \div 24 + 37 = ?$

$2 + 37 = ?$

$? = 39$

Example 4: $2 \div 2 \div 2 \div 2 \div 2 \div 2 = ?$

Solution:

$2/2 \times 2 \times 2 \times 2 \times 2 = ?$

$? = 1/16$

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