

Simplification and Approximation

Mastering simplification and approximation is crucial for quantitative aptitude. It involves evaluating expressions quickly using BODMAS/VBODMAS rules, algebraic identities, and smart rounding techniques.

$$a^m \times a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{m \times n}$$

$$\sqrt[n]{a} = a^{1/n}$$

1. VBODMAS Rule

The order of evaluation in mathematical expressions is strictly governed by VBODMAS:

V Vinculum (Bar bracket: $\overline{a+b}$)

B Brackets: $() \rightarrow \{\} \rightarrow []$

O Of (Multiplication precedence)

D Division

M Multiplication

A Addition

S Subtraction

4. Approximation Techniques

When exact calculation is unnecessary or too time-consuming, round numbers to the nearest accessible integer, tens, or hundreds place before computing.

$$\text{Example: } 498.2 \times 20.1 \approx 500 \times 20 = 10000$$

2. Fundamental Algebraic Identities

Essential for quick expansion and factoring:

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

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

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

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

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

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

3. Indices Surds Rules

Simplify exponential and radical terms efficiently: