

SIMPLIFICATION

I. **'BODMAS' Rule** : This rule depicts the correct sequence in which the operations are to be executed, so as to find out the value of a given expression. Here, '**B**' stands for '**Bracket**', '**O**' for '**of**', '**D**' for '**Division**', '**M**' for '**Multiplication**', '**A**' for '**Addition**' and '**S**' for '**Subtraction**'.

Thus, in simplifying an expression, first of all the brackets must be removed, strictly in the order $()$, $\{\}$ and $[\]$.

After removing the brackets, we must use the following operations strictly in the order :

(i) of (ii) Division (iii) Multiplication (iv) Addition (v) Subtraction.

II. **Modulus of a Real Number** : Modulus of a real number a is defined as

$$|a| = \begin{cases} a, & \text{if } a > 0 \\ -a, & \text{if } a < 0. \end{cases}$$

Thus, $|5| = 5$ and $|-5| = -(-5) = 5$.

III. **Virnaculum (or Bar)** : When an expression contains Virnaculum, before applying the 'BODMAS' rule, we simplify the expression under the Virnaculum.

→ Simplify $b - [b - (a + b) - \{b - (b - a - b)\} + 2a]$.

Give expression = $b - [b - (a + b) - \{b - (b - a - b)\} + 2a]$

$$= b - [b - a - b - \{b - (b - a - b)\} + 2a]$$

$$= b - [b - a - b - \{b - 2b + a\} + 2a]$$

$$= b - [b - a - b - \{b - 2b + a + 2a\}]$$

$$= b - [b - a - b - \{-b + 3a\}]$$

$$= b - [-a + b - 3a]$$

$$= b - [-4a + b]$$

$$= b - [-4a - b]$$

$$= b + 4a + b$$

$$= 4a + 2b$$

⇒ What value will replace the question mark in the following equation?

$$\frac{4}{2} + 3\frac{1}{6} + ? + 2\frac{1}{3} = 13\frac{2}{5}$$

Let Let given equation

$$\frac{4}{2} + 3\frac{1}{6} + ? + 2\frac{1}{3} = 13\frac{2}{5}$$

$$\frac{9}{2} + \frac{19}{6} + ? + \frac{7}{3} = \frac{67}{5}$$

$$\begin{aligned} 4\frac{1}{2} &= \\ 4 \times \frac{2}{2} &= \\ 4\frac{2}{2} &= \\ 4\frac{2}{2} &= \\ 4\frac{2}{2} &= \\ 4\frac{2}{2} &= \\ 4\frac{2}{2} &= \\ 4\frac{2}{2} &= \\ 4\frac{2}{2} &= \\ 4\frac{2}{2} &= \end{aligned}$$

$$? = \frac{67}{5} - \left(\frac{9}{2} + \frac{19}{6} + \frac{7}{3} \right)$$

$$= \frac{67}{5} - \left(\frac{27+19+14}{6} \right)$$

$$= \frac{67}{5} - \left(\frac{60}{6} \right)$$

$$= \frac{67}{5} - \frac{10}{1} \Rightarrow \frac{67}{5} - 10$$

$$? = \frac{67-50}{5} = \frac{17}{5}$$

$$? = \frac{34}{10} = \frac{17}{5}$$

$\frac{4}{15}$ of $\frac{5}{7}$ of a number is greater than $\frac{4}{9}$ of $\frac{2}{5}$ of the same number by 8
 What is half of that number? (S.B.I.P.O. 2000)

Let the number is x

$$\frac{4}{15} \times \frac{5}{7} \times x - \frac{4}{9} \times \frac{2}{5} \times x = 8$$

$$= \frac{4}{21}x - \frac{8}{45}x = 8$$

$$\Rightarrow 4 - 8 \text{ ml} = 8$$

$$= \left(\frac{4}{21} - \frac{8}{45} \right) x = 8$$

$$= \left(\frac{60 - 56}{315} \right) x = 8$$

$$\Rightarrow \frac{4}{315} x = 8$$

$$\Rightarrow 4x = 8 \times 315$$

$$\Rightarrow x = \frac{2520}{4} = 630$$

$$\Rightarrow x = 630$$

As per the question half of the number is $= \frac{x}{2} = \frac{630}{2} = 315$ ✓
 \therefore Here Required Number is 315 ✓

✓ **Simplify:** $108 + 36$ of $\frac{1}{4} + \frac{2}{5} \times 3\frac{1}{4}$.

As per the given question

$$108 \div 36 \text{ of } \frac{1}{4} + \frac{2}{5} \times 3\frac{1}{4}$$

$$\Rightarrow 108 \div 36 \times \frac{1}{4} + \frac{2}{5} \times \frac{13}{4}$$

$$\Rightarrow 108 \div 9 + \frac{13}{10}$$

$$\Rightarrow \frac{108}{9} + \frac{13}{10}$$

$$\Rightarrow \frac{12}{1} + \frac{13}{10} \Rightarrow \frac{120 + 13}{10} = \frac{133}{10}$$

$$\Rightarrow \text{A } 133 \text{ A. OR } 13\frac{3}{10}$$

$$\rightarrow \cdot \cancel{A} \frac{133}{10} \cdot \cancel{A} \text{ OR } \sqrt{12 \frac{3}{10}}$$