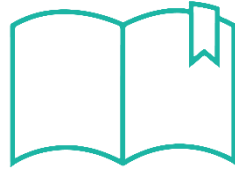


2026  
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# QUANTITATIVE APTITUDE

**For All Banking Exams**

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# 1

## CHAPTER

# Simplification

**Simplification** means reducing an expression to its simplest and most compact form by applying standard mathematical rules.

### Order to Solve

—	Vinculum/Line/Bar bracket
B	Bracket
O	Of
D	Division
M	Multiplication
A	Addition
S	Subtraction

### Types of brackets and solving order

( )	Small bracket
{ }	Curly bracket
[ ]	Square bracket

### Important Exam – Oriented Types

#### Type 1: VBODMAS based questions

Ex: Find the value of x.  $42 \div 6 \times 3 + 5 - (8 + 7) + 123 = x$

Sol:  $42 \div 6 \times 3 + 5 - (8 + 7) + 123$   
 $= 7 \times 3 + 5 - 15 + 123$   
 $= 21 + 5 - 15 + 123$   
 $= 134 \Rightarrow x = 134$

Ex: "What should come in place of question mark '?' in the following question?"

$999 \div 3 - 165 = 75 + 111 - ?$

Sol:  $999 \div 3 - 165 = 333 - 165 = 168$   
 $75 + 111 - ? = 186 - ?$   
 $168 = 186 - ? \Rightarrow ? = 186 - 168 = 18$

#### Type 2: Square and Square Root Based Questions

**Trick 1: Find the Square** (Less than 100)

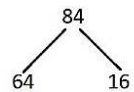
Steps:

- Split the number and find the square of each digit separately.

- Now write these numbers together. Write both ones and tens place of each number (say, if it's 32, write as 09).
- Now find the double of the product of each digit in the base number
- Add this to the answer obtained in step 2 after leaving one's place at the right.
- The sum will give you the final answer.

Ex:  $84 \rightarrow 8 \times 4 \times 2 = 64$

$6416 + 64 = 7056$



#### Trick 2: Find the Square (Greater than 100)

1. Check the nearest base number having zeroes.

**For example**, for **112**, the nearest base is **100**.

2. Find the difference from the base:

$$112 - 100 = 12$$

3. Add and subtract this difference from the number:

$$112 + 12 = 124, 112 - 12 = 100$$

4. Multiply these two numbers:

$$124 \times 100 = 12400$$

5. Now find the square of the difference:

$$12^2 = 144$$

6. Since the base is 100 (two zeroes), take the last two digits of 144, i.e. 44, and carry 1 to the left part.

7. Add the carry to 124:

$$124 + 1 = 125$$

8. Final answer:

$$112^2 = 12544$$

#### Square Root

First, we need to remember the unit digits of all squares from 1 to 10

Number	Unit Digit of Square
1	1
2	4
3	9
4	6

5	5
6	6
7	9
8	4
9	1
10	0

### Key Observations (Shortcut Tips)

- Square ending in **1** → **root ends in 1 or 9**
- Square ending in **4** → **root ends in 2 or 8**
- Square ending in **9** → **root ends in 3 or 7**
- Square ending in **6** → **root ends in 4 or 6**
- Square ending in **5** → **root ends in 5**
- Square ending in **0** → **root ends in 0**

### 3-Digit Numbers (Always 2-digit root)

#### Steps:

1. Pair digits from right → e.g. 144 → 1 | 44
2. Check unit digit → 4 → root ends with 2 or 8
3. Look at first part (1):  $1^2 = 1$  → so tens digit = 1
4. Choose correct unit digit → **12 or 18**  
✓ Closest is 12

$$\sqrt{144} = 12$$

### 4-Digit Numbers (Always 2-digit root)

#### Steps:

1. Pair digits → e.g. 2025 → 20 | 25
2. Unit digit check → 5 → root ends with 5
3. First part (20):  $4^2 = 16, 5^2 = 25$  → so tens digit = 4
4. Combine:

$$\sqrt{2025} = 45$$

### Shortcut Rule (Important)

- Find  $a$  such that:  
 $a^2 \leq \text{first part} < (a + 1)^2$
- Tens digit =  $a$
- Unit digit → from last digit rule

### 5-Digit Numbers (3-digit root)

Example:  $\sqrt{40401}$

#### Steps:

1. Pair digits → 404 | 01
2. Unit digit = 1 → root ends in 1 or 9
3. First part (404):  $20^2 = 400, 21^2 = 441$   
→ so, ten's part ≈ **20**
4. Check closer value → Answer = 201

$$\sqrt{40401} = 201$$

Ex: "What will come in the place of the question mark '?' in the following question?"

$$\sqrt{6561} + \sqrt{289} \times 2 + 45\% \text{ of } 80 = ? + 1$$

$$\begin{aligned} \text{Sol: } \sqrt{6561} + \sqrt{289} \times 2 + 45\% \text{ of } 80 &= ? + 1 \\ &= 81 + 17 \times 2 + 36 \\ &= 81 + 34 + 36 = 151 \\ 151 &= ? + 1 \Rightarrow ? = 150 \end{aligned}$$

## Type 3: Cube and Cube Root Based

### Questions

**Cube Root:** The cube root of a number  $x$  is a value  $y$  such that  $y$  multiplied by itself three times equals  $x$ , or mathematically,  $y^3 = x$

### Cube Numbers & Unit Digit Tricks

#### (1–10)

Number	Cube	Unit Digit
$1^3$	1	1
$2^3$	8	8
$3^3$	27	7
$4^3$	64	4
$5^3$	125	5
$6^3$	216	6
$7^3$	343	3
$8^3$	512	2
$9^3$	729	9
$10^3$	1000	0

### Key Shortcut Rules (Very Important)

- Cube ending in **1** → **root ends in 1**
- Cube ending in **8** → **root ends in 2**
- Cube ending in **7** → **root ends in 3**
- Cube ending in **4** → **root ends in 4**
- Cube ending in **5** → **root ends in 5**
- Cube ending in **6** → **root ends in 6**
- Cube ending in **3** → **root ends in 7**
- Cube ending in **2** → **root ends in 8**
- Cube ending in **9** → **root ends in 9**
- Cube ending in **0** → **root ends in 0**

### Cube Root Trick (5-Digit Number)

Example:  $\sqrt[3]{19683} = 27$

1. Pair digits from right → **19** | 683
2. Last digit = 3 → unit digit = 7 (since  $7^3 = 343$ )
3. Remaining part = 19 → nearest cube  $2^3 = 8, 3^3 = 27$  → take 2
4. Combine → 27

$$\sqrt[3]{19683} = 27$$

### Cube Root Trick (6-Digit Numbers)

**Example:**  $\sqrt[3]{175616} = 56$

1. Pair digits  $\rightarrow$  **175 | 616**
2. Last digit = 6  $\rightarrow$  unit digit = 6 (since  $6^3 = 216$ )
3. Remaining part = 175  
 $5^3 = 125, 6^3 = 216 \Rightarrow$  take 5
4. Combine  $\rightarrow$  56  
 $\sqrt[3]{175616} = 56$

**Ex:** "What will come in the place of the question mark '?' in the following question?"

$$\sqrt[3]{1728} \times \sqrt[3]{4096} \div \sqrt[3]{512}$$

**Sol:**

$$\begin{aligned}\sqrt[3]{1728} &= 12, \sqrt[3]{4096} = 16, \sqrt[3]{512} = 8 \\ &= 12 \times 16 \div 8 \\ &= 2 \times 2 = 24\end{aligned}$$

### Type 4: Approximate Value based questions

**Range-Based Approximation:** Range-based approximation means estimating an answer by creating an upper and lower boundary.

**Example:** Actual expression:  $249 \times 3.9$  Lower bound:  $250 \times 4 = 1000$  Upper bound:  $248 \times 4.1 \approx 1016$  So the approximate answer should lie between 1000 and 1016.

### Tricks to Solve Approximation Based Questions:

#### 1. Rounding Off Numbers:

- ✓ Round off numbers to the nearest ten, hundred, or thousand to simplify addition, subtraction, multiplication, and division.
- ✓ For example, rounding 498 to 500 or 1523 to 1500.

#### 2. Using Significant Figures:

- ✓ Retain a few significant digits and drop less significant ones to simplify calculations.
- ✓ For example, approximating 123.456 to 123.5 or 0.004567 to 0.00457.

#### 3. Multiplication and Division by Powers of 10:

- ✓ Simplify calculations by multiplying or dividing by powers of 10.

- ✓ For example,  $423 \times 99$  can be approximated as  $423 \times 100 = 42300$  and then subtract 423 ( $42300 - 423 = 41877$ ).

#### 4. Using Common Fractions:

- ✓ Convert complex fractions into simpler ones.
- ✓ For example, instead of using 0.3333, use  $1/3$ , or instead of 0.142857, use  $1/7$ .

**Ex:** "Directions: Determine the approximate value of '?' in the following question. (You are not expected to calculate the exact value)

$$14\% \text{ of } 75 + ?\% \text{ of } 90 = 31.9$$

**Sol:**  $14\% \text{ of } 75 \approx 10.5$

$$\begin{aligned}10.5 + ?\% \text{ of } 90 &= 31.9 \Rightarrow ?\% \text{ of } 90 \\ &\approx 31.9 - 10.5 = 21.4\end{aligned}$$

$$? = \frac{21.4 \times 100}{90} \approx 23.8 \approx 24$$

#### Step to Solve (Exam Approach)

1. First find known percentage  $\rightarrow 14\% \text{ of } 75 = 10.5$
2. Subtract from total  $\rightarrow 31.9 - 10.5 = 21.4$
3. Convert to percentage  $\rightarrow \frac{21.4}{90} \times 100$
4. Approximate  $\rightarrow \approx 24$

**Ex:** "What approximate value should come in place of question mark (?) in the following question?"

$$? = \sqrt{723.99 + \left(\frac{1998.970}{4.795}\right)^{1/2}} \div 4.0019$$

**Sol:**

**Approximate values:**

$$\begin{aligned}723.99 &\approx 724, 1998.970 \approx 2000, 4.795 \\ &\approx 5, 4.0019 \approx 4\end{aligned}$$

$$\frac{2000}{5} = 400 \Rightarrow \sqrt{400} = 20$$

$$20 \div 4 = 5$$

$$? = \sqrt{724 + 5} = \sqrt{729} = 27$$

#### Step to Solve (Exam Trick)

1. Round numbers  $\rightarrow 2000, 5, 4, 724$
2. Solve inside  $\rightarrow 2000 \div 5 = 400$
3. Square root  $\rightarrow \sqrt{400} = 20$
4. Divide  $\rightarrow 20 \div 4 = 5$
5. Final  $\rightarrow \sqrt{724 + 5} = \sqrt{729} = 27$

## Type 5: Fraction Based Questions

Ex: What will be the value of x in the given equation?

$$\frac{1}{3^3} \times \frac{2}{3^3} \times \left(2\frac{1}{4}\right)^2 = \frac{x}{18}$$

Sol:

Step 1: Combine powers:  $3^3 \times 3^3 = 3^6 = 729$

$$\Rightarrow \frac{2}{729}$$

Step 2: Convert & square:  $2\frac{1}{4} = \frac{9}{4} \Rightarrow \left(\frac{9}{4}\right)^2 = \frac{81}{16}$

Step 3: Cancel smartly

$$\begin{aligned} & \frac{2}{729} \times \frac{81}{16} \\ 729 &= 81 \times 9 \Rightarrow \frac{81}{729} = \frac{1}{9} \\ & \Rightarrow \frac{2}{9 \times 16} = \frac{1}{72} \end{aligned}$$

Step 4: Compare:  $\frac{1}{72} = \frac{x}{18} \Rightarrow x = \frac{18}{72} = \frac{1}{4}$

Ex: find the value of  $\frac{7}{9} - \frac{17}{12} + \frac{21}{6} + \frac{35}{4}$ .

Sol:

Step 1: Take LCM of denominators

LCM of 9, 12, 6, 4 = 36

Step 2: Convert all into denominator 36

$$\frac{28 - 51 + 126 + 315}{36}$$

Step 4: Solve numerator (fast grouping)

$$(28 - 51) = -23$$

$$(-23 + 126) = 103$$

$$(103 + 315) = 418$$

Step 5: Final Answer =  $\frac{418}{36}$

Simplify: =  $\frac{209}{18}$

## Type 6: Percentage Based Questions

Fraction	Percentage	Percentage	Fraction	Percentage	Percentage
1	100%	100%	$\frac{1}{16}$	6.25%	$6\frac{1}{4}\%$
$\frac{1}{2}$	50%	50%	$\frac{3}{8}$	37.5%	$37\frac{1}{2}\%$
$\frac{1}{3}$	33.33%	$33\frac{1}{3}\%$	$\frac{5}{8}$	62.5%	$62\frac{1}{2}\%$
$\frac{1}{4}$	25%	25%	$\frac{7}{8}$	87.5%	$87\frac{1}{2}\%$
$\frac{1}{5}$	20%	20%	$\frac{2}{3}$	66.66%	$66\frac{2}{3}\%$
$\frac{1}{6}$	16.66%	$16\frac{2}{3}\%$	$\frac{5}{6}$	83.33%	$83\frac{1}{3}\%$
$\frac{1}{7}$	14.28%	$14\frac{2}{7}\%$	$\frac{1}{25}$	4%	4%
$\frac{1}{8}$	12.5%	$12\frac{1}{2}\%$	$\frac{1}{40}$	2.5%	$2\frac{1}{2}\%$
$\frac{1}{9}$	11.11%	$11\frac{1}{9}\%$	$\frac{4}{5}$	80%	80%
$\frac{1}{11}$	9.09%	$9\frac{1}{11}\%$	$\frac{3}{4}$	75%	75%
$\frac{1}{12}$	8.33%	$8\frac{1}{3}\%$	$\frac{1}{19}$	5.26%	$5\frac{5}{19}\%$
$\frac{1}{15}$	6.66%	$6\frac{2}{3}\%$	$\frac{1}{20}$	5%	5%

### Basic Concept

1. A percentage is converted into a fraction or a decimal by removing the percent sign and dividing the value by 100.

$$14\frac{5}{8}\% = \frac{117}{8}\% = \frac{117}{8 \times 100} = \frac{117}{800}$$

2. Determine  $y\%$  of the number  $x$

$$y\% \text{ of } x = x \times \frac{y}{100}$$

To express  $x$  as a percentage of  $y$ , the required percentage is  $\frac{x}{y} \times 100\%$

**Ex:** What will come in the place of the question mark '?' in the following question?

$$36\% \text{ of } 250 - 40\% \text{ of } 130 = 150\% \text{ of } (?) - 22$$

**Sol:** Convert % to fraction:  $36\% = \frac{9}{25}$ ,  $40\% = \frac{2}{5}$ ,  $150\% = \frac{3}{2}$ .

$$\text{LHS: } \frac{9}{25} \times 250 - \frac{2}{5} \times 130 = 90 - 52 = 38.$$

$$\text{So, } 38 = \frac{3}{2}x - 22 \Rightarrow 60 = \frac{3}{2}x \Rightarrow x = 40$$

**Ex:** What will come in the place of the question mark '?' in the following question?

$$50\% \text{ of } 170 + 60\% \text{ of } 180 + 110 = ? + 10$$

**Sol:**  $50\%$  of  $170 = 85$  and  $60\%$  of  $180 = 108$ .

$$\text{LHS} = 85 + 108 + 110 = 303.$$

$$\text{So, } 303 = ? + 10. \Rightarrow ? = 293$$

### Some Surdes and Indices Formulae

- $a^{m+n} = a^m \times a^n$
- $a^m \times a^n \times a^p \times \dots = a^{m+n+p\dots}$
- $\frac{a^m}{a^n} = a^{m-n}$
- $(d^m)^n = d^{nm} = (d^n)^m$
- $a^{m^z} = a^{m \times m \times m \times \dots}$  upto  $n$  times  $\neq (a^m)^n$
- $(ab)^n = a^n b^n$
- $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$
- $(-a)^n = [a^n \text{ when } n \text{ is even, } -a^n \text{ when } n \text{ is odd}]$
- $a^n = a^{(-1)n} = (a^{-1})^n = \left(\frac{1}{a}\right)^n = \frac{1}{a} \times \frac{1}{a} \times \frac{1}{a} \dots n \text{ times}$
- $a^{\frac{p}{q}} = a^{\frac{1}{q} \times p} = (a^{1/q})^p$  is positive integer where  $q \neq 0 = a^{1/q} \times a^{1/q} \times \dots$  upto  $p$  times
- $a^m = a^n \Rightarrow m = n$  where  $a \neq 0, 1$ .
- $a^m = b^m \Rightarrow a = b$

### Some Algebraic Formulae

- $(a + b)^2 = a^2 + 2ab + b^2$
- $(a - b)^2 = a^2 - 2ab + b^2$
- $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$
- $(a + b)^2 - (a - b)^2 = 4ab$
- $a^2 - b^2 = (a + b)(a - b)$
- $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$
- $(a - b)^3 = a^3 - b^3 - 3ab(a - b)$
- $(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$
- $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$



## LEVEL - 1

**Q.1** Directions: Determine the approximate value of '?' in the following question.



(You are not expected to calculate the exact value)

$$1998.8991 \div 100.010 - 5.0211 \times 2.8998 + 7.0198 = ? \quad \text{[RRB Officer Scale - I 2022]}$$

- (A) 4 (B) 6  
(C) 8 (D) 10  
(E) 12

**Q.2** Find the approximate value of '?' in the following question.

$$64.14 \times \frac{9}{8} \text{ of } 500\% - 71.92 \text{ of } \frac{7}{9} \times 400\% = ? \quad \text{[IBPS Clerk 2023]}$$

- (A) 136 (B) 126  
(C) 146 (D) 132  
(E) None of these

**Q.3** Find the value of the given expression.

$$\sqrt{20 - \sqrt{20 - \sqrt{20 - \dots \infty}}}$$

[EPFO SSA 2023]

- (A) 4 (B) 6  
(C) 5 (D) 2  
(E) 1

**Q.4** What approximate value should come in place of the question mark (?) in the following question?

$$(69.98\% \text{ of } 99.99) - (19.98\% \text{ of } 224.99) = (?)$$

[IBPS Clerk 2020]

- (A) 24 (B) 25  
(C) 23 (D) 26  
(E) 21

**Q.5** What approximate value should come in the place of question mark (?) in the following question?

$$(45.875 - 34.75) \times (23.89 - 15.99) = ? + (34.87 - 17.98) \quad \text{[IBPS Clerk 2022]}$$

- (A) 80 (B) 65  
(C) 71 (D) 75  
(E) 78

**Q.6** What approximate value should come in the place of question mark (?) in the following question?

$$(59.99\% \text{ of } 3499.99) + \{(19.92\% \text{ of } 1224.95) \div 4.95\} = ? \quad \text{[IBPS PO 2022]}$$

- (A) 2085 (B) 2149  
(C) 2471 (D) 2235  
(E) 2238

**Q.7** What approximate value should come in the place of question mark (?) in the following question?

$$\sqrt[3]{27.27 + 12.99 - 14.99\% \text{ of } 79.98} = ?$$

[IBPS PO 2020]

- (A) 4 (B) 2  
(C) -2 (D) 8  
(E) -4

**Q.8** What approximate value should come in the place of question mark (?) in the following question?

$$121.98 - [70.98 + \{4.14 - (4.98 - (22.98 - 21.12))\}] = ? \quad \text{[SBI PO 2023]}$$

- (A) 40 (B) 50  
(C) 30 (D) 60  
(E) 20

**Q.9** What approximate value should come in the place of question mark (?) in the following question?

$$149.99 + 44.89 \times 1.92 \times (35.99 - 16.06) \div 17.97 = ? \quad \text{[RRB Officer Scale - I 2022]}$$

- (A) 155 (B) 210  
(C) 250 (D) 285  
(E) 195

**Q.10** What approximate value should come in the place of question mark (?) in the following question?

$$19.99\% \text{ of } 119.99 + \sqrt[3]{216.06} - \sqrt{624.99} = ?$$

[SBI PO 2022]

- (A) 3 (B) 15  
(C) 12 (D) 5  
(E) 10

**Q.11** What approximate value should come in the place of question mark (?) in the following question?

$$24.97\% \text{ of } 160.05 + 11.02\% \text{ of } 1099.97 = ?^2 - 3.99\% \text{ of } 200.02 \quad \text{[SBI PO 2022]}$$

- (A) 17 (B) 9  
(C) 5 (D) 13  
(E) 21

**Q.12** What approximate value should come in the place of question mark (?) in the following question?

$$34.98\% \text{ of } 799.99 + 64.95\% \text{ of } 199.98 = ? + 49.99\% \text{ of } 249.99 \quad \text{[SBI PO 2023]}$$

- (A) 285 (B) 295  
(C) 275 (D) 225  
(E) 245

## SIMPLIFICATION

**Q.13** What approximate value should come in the place of question mark (?) in the following question?

$$461.98 \div 20.96 \times \sqrt[3]{728.98} + (6.96)^2 = ?$$

**[RRB Officer Scale - I 2023]**

- (A) 256 (B) 241  
(C) 237 (D) 247  
(E) 226

**Q.14** What approximate value should come in the place of question mark (?) in the following question?

$$5.982 + (4.972 - 11.92) \times 3.95 = ?$$

**[RRB Officer Scale - I 2022]**

- (A) 98 (B) 88  
(C) 102 (D) 92  
(E) 82

**Q.15** What approximate value will come in place of question mark (?) in the following question?

$$(64.98\% \text{ of } 400.01 + 33.06 \times 21.918 - 743.018) = ?$$

**[SBI PO 2023]**

- (A) 207 (B) 225  
(C) 216 (D) 243  
(E) 238

**Q.16** What approximate value will come in the place of the question mark '?' in the following question?

$$\sqrt{224.99} \div \sqrt{25.02} + 63 \div (9 \times (\frac{7}{3})) = ?$$

**[IDBI Executive 2021]**

- (A) 9 (B) 8  
(C) 7 (D) 6  
(E) None of the above

**Q.17** What approximate will come in the place of the question mark '?' in the following question?

$$(544.87 \div 5.05 + 199.89 \div 4.01) \div ? = 52.97$$

**[IDBI Executive 2021]**

- (A) 4 (B) 10  
(C) 3 (D) 5  
(E) 6

**Q.18** What approximate will come in the place of the question mark '?' in the following question?

$$\{\sqrt{(784.02)} - 18.96\} \div 2.95 = ? \div 42.04$$

**[IDBI Executive 2021]**

- (A) 105 (B) 145  
(C) 126 (D) 180  
(E) 200

**Q.19** What approximate will come in the place of the question mark '?' in the following question?

$$9.891 - [8.992 - \{7.796 - 6.610 - 5.190 + 3\}] = ?$$

**[RRB Officer Scale - I 2023]**

- (A) 3.6 (B) 0  
(C) 5.2 (D) 4.7  
(E) None of them

**Q.20** What should come in place of question mark (?) in the following question?

$$\sqrt{1296} + \sqrt[3]{216} = \sqrt{441} + ?$$

**[IBPS Clerk 2020]**

- (A) 21 (B) 12  
(C) 42 (D) 24  
(E) 28

**Q.21** What should come in the place of the question mark (?) in the following question?

$$[(27 \times 10) \div 30 + 10500 \div 500] = ? \times 15$$

**[SBI Clerk 2022]**

- (A) 1 (B) 4  
(C) 2.65 (D) 0.90  
(E) 2

**Q.22** What value should come in place of question mark(?) in the question?

$$\sqrt{43 + \sqrt{33 + \sqrt{4 + \sqrt{25}}}} = ?$$

**[IBPS Clerk 2020]**

- (A) 12 (B) -9  
(C) 7 (D) 11  
(E) -6

**Q.23** What will come in place of the question mark?

$$500 \text{ of } \frac{1}{5} - \{4 \times (50 \div ?)\} = 80$$

**[IBPS Clerk 2023]**

- (A) 20 (B) 30  
(C) 10 (D) 40  
(E) 50

**Q.24** What will come in the place of the question mark?' in the following question?

$$\frac{?}{2} = 9\frac{1}{6} + 6\frac{1}{6} + 2\frac{1}{6} \quad \text{[IBPS Clerk 2023]}$$

- (A) 35 (B) 25  
(C) 32 (D) 30  
(E) 28

**Q.25** What will come in the place of the question mark?' in the following question?

$$\frac{4}{13} \times \frac{3}{8} \times \frac{65}{2} \times ? = 45 \quad \text{[IBPS Clerk 2022]}$$

- (A) 14 (B) 17  
(C) 10 (D) 12  
(E) None of these

# SIMPLIFICATION

## LEVEL-2

**Q.26** If  $\left(\frac{3}{5}\right)^x \times \left(\frac{5}{3}\right)^{2x} = \frac{625}{81}$ , then the value of is:

**[EPFO SSA 2023]**

- (A) 6 (B) 4  
(C) 3 (D) 9  
(E) 5



**Q.27** If  $x = \sqrt{4 \cdot \sqrt{4 \cdot \sqrt{4 \cdot \sqrt{4 \dots}}}}$  then what is the value of x?

**[EPFO SSA 2023]**

- (A) 2 (B) 4  
(C) 8 (D) 16  
(E) 5

**Q.28** What approximate value should come in place of "?" in the following equation:  
 $\{(784.03)^{1/2} \times 3.97\} + (29.07 \times 12.96) =$   
 $(?)^2 - (7.92 \times 5.01)$

**[IBPS PO 2024]**

- (A) 529 (B) 8  
(C) 24 (D) 23  
(E) None of these

**Q.29** What approximate value should come in place of question mark?  
 $(22.03\% \text{ of } 150.01) + (361.33)^{1/2} +$   
 $(63.92 \div 2.012) + (11.02\% \text{ of } 499.98) = ?$

**[SBI PO 2022]**

- (A) 129 (B) 119  
(C) 139 (D) 149  
(E) 159

**Q.30** What approximate value should come in place of the question mark (?) in the following question?

$$(11.91)^2 \div (3.98)^2 \times (12.94)^2 - (18.89)^2 = ?$$

**[IBPS Clerk 2020]**

- (A) 1244 (B) 1221  
(C) 1160 (D) 1241  
(E) 1143

**Q.31** What approximate value should come in place of the question mark (?) in the following question? (You are not expected to calculate the exact value)

$$\sqrt{3.98} + (\sqrt{((2.22)^2 + 4.85)}) \times 5.69 =$$

$$24.71\% \text{ of } ?$$

**[SBI PO 2023]**

- (A) 60 (B) 70  
(C) 80 (D) 90  
(E) 23

**Q.32** What approximate value should come in the place of question mark (?) in the following question?

$$14.972 \times 4.99 \div 44.78 + 299.99 \div \sqrt{5624.98} \times 12.93 = ?$$

**[SBI PO 2023]**

- (A) 71 (B) 68  
(C) 77 (D) 70  
(E) None of These

**Q.33** What approximate value should come in the place of question mark (?) in the following question?

$$259.09 \div [(4.95)^2 + (4.04) \text{ of } \{32.93 \div (22.22 \div 1.92)\}] = ? - 64.89$$

**[RRB Officer Scale - I 2023]**

- (A) 95 (B) 80  
(C) 72 (D) 89  
(E) 66

**Q.34** What approximate value should come in the place of question mark (?) in the following question?

$$349.99 - [15.952 - (87.88 + 95.94) \div 7.99] = ?$$

**[IBPS PO 2023]**

- (A) 123 (B) 117  
(C) 137 (D) 133  
(E) 113

**Q.35** What approximate value should come in the place of question mark (?) in the following question?

$$459.98 \div 19.96 \times \sqrt[3]{728.98} + (6.96)^2 + 24.78 = \sqrt[3]{3374.8} + ?$$

**[RRB Officer Scale - I 2023]**

- (A) 244 (B) 266  
(C) 240 (D) 282  
(E) 234

**Q.36** what approximate value should come in the place of question mark (?) in the following question? (You are not expected to calculate the exact value)

$$9.87\% \text{ of } [(299.96)^2 + (20.24)^2] = 999.99\% \text{ of } 4 + ?$$

**[SBI PO 2023]**

- (A) 8990 (B) 9899  
(C) 9000 (D) 9989  
(E) N.O.T.

**Q.37** What approximate value should come in the place of the question mark '?' in the following question?

$$\sqrt{2401} \div 6.92 + \sqrt{143.79} + \sqrt[3]{728.82} \times 14.896 = ?$$

**[RRB Officer Scale - I 2024]**

- (A) 154 (B) 144  
(C) 191 (D) 200  
(E) None of these

## SIMPLIFICATION

**Q.38** What approximate value will come in place of the question mark (?) in the following questions? (You are not expected to calculate the exact value)  
 $8.001 \times 520.09 \div ? = \sqrt{289.03} - 27.97 \times 7.02 + 243.1$  **[RRB Officer Scale - I 2023]**

- (A) 60 (B) 65  
 (C) 70 (D) 75  
 (E) 80

**Q.39** What approximate value will come in the place of the question mark '?' in the following question?

$$\frac{540.34}{17.99} \div \frac{29.99}{449.89} \times \frac{1}{89.78} = ? \quad \text{[IBPS PO 2022]}$$

- (A) 45 (B) 90  
 (C) 5 (D) 10  
 (E) 15

**Q.40** What approximate value will come in the place of the question mark '?' in the following question?

$$\{12960.31 \div 79.79 \times (9.75)^2\} \div 89.89 + \sqrt{195.79} - 10.23 = ? \quad \text{[SBI PO 2023]}$$

- (A) 184 (B) 162  
 (C) 204 (D) 211  
 (E) 193

**Q.41** What approximate will come in the place of the question mark '?' in the following question?

$$\left(\frac{599.02}{119.98}\right) + \left(\frac{1659.83}{82.95}\right) \sqrt{10001} = ?$$

**[RRB Officer Scale - I 2024]**

- (A) 75 (B) -75  
 (C) 85 (D) -85  
 (E) None of these

**Q.42** What approximate will come in the place of the question mark '?' in the following question?

$$\sqrt{1155.91} + \sqrt{730} + (44.99 \div 8.97 - 0.99)^{0.49} = ?$$

**[SBI PO 2023]**

- (A) 64 (B) 36  
 (C) 49 (D) 63  
 (E) 72

**Q.43** What approximate will come in the place of the question mark '?' in the following question?

$$37.98\% \text{ of } 549.99 + \sqrt{(49.02) \div ?} = 7.99 \times (2.97)^3$$

**[SBI PO 2023]**

- (A) 0 (B) 1  
 (C) 2 (D) 3  
 (E) 4

**Q.44** What should come in place of question mark (?) in the following question?

$$6\frac{5}{3} + 7\frac{7}{6} + 4\frac{5}{12} + \frac{3}{4} = ? \quad \text{[IBPS Clerk 2023]}$$

- (A) 21 (B)  $\frac{233}{12}$   
 (C) 20 (D)  $\frac{242}{12}$   
 (E)  $\frac{243}{13}$

**Q.45** What value should come in the place of question mark (?) in the following question?

$$\left(\frac{4}{5} \times \frac{3}{5}\right) \div \frac{16}{35} + \frac{4}{5} = ? \quad \text{[IBPS Clerk 2020]}$$

- (A) 1.65 (B) 1.75  
 (C) 1.45 (D) 1.85  
 (E) 1.52

**Q.46** What will be the value of x in the given equation?

$$\frac{1}{3^3} \times \frac{2}{3^3} \times \left(2\frac{1}{4}\right)^2 = \frac{x}{18} \quad \text{[IBPS Clerk 2020]}$$

- (A)  $\frac{1}{4}$  (B)  $\frac{1}{2}$   
 (C)  $\frac{1}{8}$  (D) 4  
 (E) 8

**Q.47** What will come in place of (?) in the following questions?

$$6\frac{2}{3} + 5\frac{5}{9} - 4\frac{1}{6} - 2\frac{1}{2} = ?$$

**[IBPS Clerk 2020]**

- (A)  $6\frac{2}{3}$  (B)  $5\frac{5}{9}$   
 (C)  $4\frac{1}{6}$  (D)  $3\frac{2}{3}$   
 (E)  $2\frac{1}{3}$

**Q.48** What will come in the place of the question mark '?' in the following question?

$$\frac{26}{24} \text{ of } 408 + \frac{25}{48} \% \text{ of } 43200 = ?$$

**[SBI Clerk 2022]**

- (A) 547 (B) 447  
 (C) 467 (D) 647  
 (E) 667

**Q.49** What will come in the place of the question mark '?' in the following question?

$$1\frac{1}{6} + \frac{1}{8} + 2\frac{5}{8} - 3\frac{2}{3} = ? \quad \text{[SBI Clerk 2024]}$$

- (A)  $\frac{1}{5}$  (B)  $\frac{2}{3}$   
 (C)  $\frac{1}{6}$  (D)  $\frac{1}{4}$   
 (E)  $\frac{1}{2}$

**Q.50** What will come in the place of the question mark '?' in the following question?

$$2\frac{1}{4} + 3\frac{1}{6} - 1\frac{2}{8} = ? + 1\frac{1}{12} \quad \text{[SBI Clerk 2024]}$$

- (A)  $4\frac{3}{12}$  (B)  $3\frac{4}{24}$   
 (C)  $3\frac{1}{12}$  (D)  $3\frac{5}{12}$   
 (E)  $3\frac{4}{12}$

# SIMPLIFICATION

## LEVEL-3

**Q.51** find the value of  $\frac{7}{9} - \frac{17}{12} + \frac{21}{6} + \frac{35}{4}$ .

**[IBPS Clerk 2023]**

(A)  $\frac{108}{12}$

(B)  $\frac{146}{9}$



(C)  $\frac{189}{12}$

(D)  $\frac{209}{18}$

(E)  $\frac{418}{18}$

**Q.52** If we multiply fraction by itself and divide the product by its reciprocal then the fraction thus obtained is  $18\frac{26}{27}$ . The fraction is.

**[IBPS PO 2020]**

(A)  $\frac{8}{27}$

(B)  $2\frac{2}{3}$

(C)  $1\frac{1}{3}$

(D)  $2\frac{1}{3}$

(E) None of these

**Q.53** The value of  $5 \div 8$  of  $2 - 10 \div 5$  of  $8 + 6 \div 15 \times (7 - 4)$  of  $2 - 2$  is:

**[EPFO SSA 2023]**

(A)  $\frac{43}{22}$

(B)  $\frac{197}{80}$

(C)  $\frac{37}{80}$

(D)  $\frac{1}{16}$

(E)  $\frac{4}{8}$

**Q.54** What approximate value should come in place of the question mark (?) in the following question?

$$(15.72)^2 + 16.69 \times 24.41 - 363.76 \div 27.69 + 29.77 = ?$$

**[IDBI Executive 2021]**

(A) 671

(B) 651

(C) 647

(D) 581

(E) 681

**Q.55** What approximate value should come in place of the question mark (?) in the following question?

$$292 + 34.12 \% \text{ of } 700 \div \sqrt[3]{2744.21} = ? + \sqrt[3]{2197}$$

**[SBI PO 2023]**

(A) 945

(B) 855

(C) 895

(D) 845

(E) 865

**Q.56** What approximate value should come in the place of question mark (?) in the following question?

$$(12.98)^5 \div (168.9)^2 \times 2197.27 \div (12.98)^6 = 13.13(? - 4)$$

**[IDBI Executive 2023]**

(A) 8

(B) 4

(C) 5

(D) 7

(E) 2

**Q.57** What approximate value should come in the place of question mark (?) in the following question?

$$454.95 - 229.99 + ?^2 = 14.992 + 26.97 \times 179.97 \div 20.91$$

**[RRB Officer Scale - I 2023]**

(A) 21

(B) 29

(C) 8

(D) 30

(E) 15

**Q.58** What approximate value should come in the place of question mark (?) in the following question?

$$74.95 - 2.93 \times \left(\frac{35.96}{5.99} \div 2.99\right) \div \left(\frac{1}{2.99}\right) + 5.96 = ?$$

**[RRB Officer Scale - I 2023]**

(A) 53

(B) 67

(C) 57

(D) 63

(E) 47

**Q.59** What approximate value should come in the place of question mark (?) in the following question?

$$79.99 \times [11.98 \times (4.982 - 3.982)] \div (8.99 \times 4.98) = ? \% \text{ of } 433.99$$

**[RRB Officer Scale - I 2023]**

(A) 50

(B) 64

(C) 34

(D) 24

(E) 44

**Q.60** What approximate value will come in place of the question mark (?) in the following question? (Note: You are not expected to calculate the exact value.)

$$123.23 + 45 \times 45 - 25\% \text{ of } 499.9 = (99.99 \times 49.5)\% \text{ of } 29.9 + ?$$

**[RRB Officer Scale - I 2023]**

(A) 522

(B) 621

(C) 720

(D) 424

(E) 538

**Q.61** What approximate will come in the place of the question mark '?' in the following question?

$$[(6.98 + 2.95\sqrt{4.99}) \times (6.98 - 2.95\sqrt{4.99})]^{1/2} = ?$$

**[RRB Officer Scale - I 2023]**

(A) 35

(B) 18

(C) 7

(D) 2

(E) None of them

## SIMPLIFICATION

**Q.62** What approximately will come in the place of the question mark '?' in the following question?

$$\left[ \left( \frac{1105.05}{13} \right) - 4.8\% \text{ of } 250 - 7.8\% \text{ of } (35 \times 10) \right] = ?\% \times 300$$

**[IBPS Clerk 2021]**

- (A) 15  
(B) 16  
(C) 32  
(D) 12  
(E) 10

**Q.63** What should come in place of question mark '?' in the following question?

$$(2 \times \sqrt{891} - 21) + (\sqrt{11} - 9)^2 = (?)^2 - 73$$

**[IDBI Executive 2022]**

- (A) 22  
(B)  $8\sqrt{9}$   
(C)  $9\sqrt{16}$   
(D)  $4\sqrt{9}$   
(E)  $3\sqrt{8}$

**Q.64** What should come in place of question mark (?) in the following question?

$$\frac{0.125}{0.75} + \frac{0.2}{0.15} + \frac{0.30}{4.5} + \frac{0.2}{0.06} = ?$$

**[IBPS Clerk 2020]**

- (A) 4.5  
(B) 4.9  
(C) 3.89  
(D) 7.24  
(E) 6.34

**Q.65** What should come in the place of the question mark '?' in the following question?

$$12\frac{2}{3} \div 6\frac{1}{3} + 7\frac{1}{7} \times \frac{2}{5} - 12.5\% \text{ of } 12 = ?$$

**[SBI Clerk 2024]**

- (A) 3.15  
(B) 3.35  
(C) 3.65  
(D) 4.25  
(E) 4.75

**Q.66** What value should come in place of question mark (?) in the following question?

$$\sqrt[3]{19683} + \sqrt[2]{9604} - \sqrt[3]{3375} = ?$$

$$- \left( 3\frac{1}{3}\% \text{ of } 2070 \right) \quad \text{[IBPS Clerk 2023]}$$

- (A) 159  
(B) 169  
(C) 179  
(D) 149  
(E) 189

**Q.67** What will come in place of (?) in the following questions?

$$16\frac{2}{3}\% \text{ of } 624 \times 4\frac{1}{6}\% \text{ of } ? = 5304$$

**[IBPS Clerk 2020]**

- (A) 1220  
(B) 1100  
(C) 1224  
(D) 1300  
(E) 4800

**Q.68** What will come in place of question mark '?' in the following question?

$$\frac{4}{7} \times \{165 + 126 - 546 \div 7\} \text{ of } \frac{24}{27} = ?$$

**[IDBI Executive 2022]**

- (A) 220.97  
(B) 240.76  
(C) 168.66  
(D) 108.20  
(E) 167.81

**Q.69** What will come in place of question mark (?) in the following question?

$$2\frac{1}{2} + 3\frac{1}{4} + ? + 2\frac{1}{3} = 13\frac{5}{12}$$

**[IBPS Clerk 2022]**

- (A)  $5\frac{1}{3}$   
(B)  $3\frac{1}{3}$   
(C)  $6\frac{1}{3}$   
(D)  $4\frac{1}{3}$   
(E) none of these

**Q.70** What will come in place of question mark (?) in the following questions?

$$1\frac{4}{3} + 2\frac{4}{9} - \frac{1}{12} + 1\frac{5}{6} = ?$$

**[IBPS Clerk 2020]**

- (A)  $\frac{235}{36}$   
(B)  $\frac{245}{36}$   
(C)  $\frac{234}{72}$   
(D)  $\frac{243}{72}$   
(E) None of these

**Q.71** What will come in place of question mark(?) in the following questions?

$$3\frac{6}{7} \div 33.33\% \text{ of } 162 \times 2\frac{1}{2} = ?$$

**[IBPS Clerk 2022]**

- (A)  $\frac{1}{32}$   
(B)  $\frac{5}{28}$   
(C)  $\frac{2}{5}$   
(D)  $\frac{4}{3}$   
(E)  $\frac{6}{25}$

**Q.72** What will come in the place of 'x' in the following question?

$$0.87 \times 9 + \sqrt[3]{2.744} - \left( \frac{5}{8} \right) \text{ of } 5.12 = x\% \text{ of}$$

$$(33.84 - 9.72) \quad \text{[IDBI Executive 2022]}$$

- (A) 25  
(B) 23  
(C) 21  
(D) 19  
(E) 27

**Q.73** What will come in the place of the question mark '?' in the following question? ?% of

$$550 \times \left( \frac{3}{5} \right) + \sqrt{625} = 28.57\% \text{ of } 630 + 10$$

**[SBI Clerk 2022]**

- (A) 100  
(B) 260  
(C) 70  
(D) 180  
(E) 50

## SIMPLIFICATION

**Q.74** What will come in the place of the question mark '?' in the following question?  
 $(\sqrt{1024} + 19 \times 12) \div \sqrt{676} - 4 + 4680 \div ? = 474$

[SBI Clerk 2025]

- (A) 10                      (B) 8  
 (C) 16                      (D) 3  
 (E) 11

**Q.75** What will come in the place of the question mark '?' in the following question?

$$(18)^{7.9} \times (3)^{0.1} \times (6)^{0.1} \div \{(3)^4 \times (6)^4\} = (18)^?$$

[IBPS Clerk 2021]

- (A) 8                      (B) 4  
 (C) 3                      (D) 9  
 (E) 5

### ANSWER KEY

<b>Ques.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>
<b>Ans.</b>	E	A	A	B	C	B	A	B	C	D	D	A	D	B	D
<b>Ques.</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>
<b>Ans.</b>	D	C	C	B	A	E	C	C	A	D	B	B	D	C	C
<b>Ques.</b>	<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>	<b>41</b>	<b>42</b>	<b>43</b>	<b>44</b>	<b>45</b>
<b>Ans.</b>	C	C	C	B	B	C	A	B	C	A	B	D	B	A	D
<b>Ques.</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>50</b>	<b>51</b>	<b>52</b>	<b>53</b>	<b>54</b>	<b>55</b>	<b>56</b>	<b>57</b>	<b>58</b>	<b>59</b>	<b>60</b>
<b>Ans.</b>	A	B	E	D	C	D	B	C	E	D	E	E	D	E	E
<b>Ques.</b>	<b>61</b>	<b>62</b>	<b>63</b>	<b>64</b>	<b>65</b>	<b>66</b>	<b>67</b>	<b>68</b>	<b>69</b>	<b>70</b>	<b>71</b>	<b>72</b>	<b>73</b>	<b>74</b>	<b>75</b>
<b>Ans.</b>	D	A	D	B	B	C	C	D	A	A	B	A	E	A	B



ToppersNotes

Unleash the topper in you

# 2

## CHAPTER

# Number Series

### What is Series?

- A series is a systematic arrangement of numbers or letters within a defined group. In competitive exams, sequences of numbers, letters, or a mix of both are presented. One position in the sequence is either left blank or contains an incorrect number or letter. Candidates are tasked with completing the series by selecting the correct option to fill the blank or identify the incorrect element.

### Here's a clearer and concise way to solve number series problems:

- **Look for Patterns:** Check if the numbers are increasing or decreasing by a constant (addition/subtraction) or multiplied/divided by a constant (multiplication/division).
- **Find Differences:**
  - ✓ If the difference between consecutive numbers is the same, it's an arithmetic series (e.g., 2, 5, 8, 11).
  - ✓ If the second difference (difference of differences) is constant, it's a quadratic series.
- **Check for Multiplication/Division:** Look if each number is multiplied or divided by a constant to get the next number (e.g., 3, 6, 12, 24 where each number is doubled).
- **Recognize Special Sequences:**
  - ✓ **Squares:** 1, 4, 9, 16, ...
  - ✓ **Cubes:** 1, 8, 27, ...
  - ✓ **Fibonacci:** Each number is the sum of the two preceding ones (e.g., 0, 1, 1, 2, 3, 5).
- **Check for Ratios:** If the numbers increase by a constant ratio, it's a geometric progression (e.g., 2, 4, 8, 16).
- **Test the Options:** If options are provided, check which one follows the identified pattern.

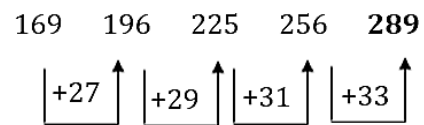
### Type-1 Series in Increasing Order

**Ex: In the following question, select the missing number from the given series.**

169, 196, 225, 256, \_?

- 1. 289
- 2. 324
- 3. 441
- 4. 361

**Ans:**

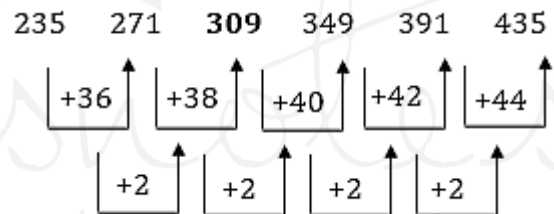


**Ex: Which of the following numbers will replace the question mark (?) in the given series?**

235, 271, ?, 349, 391, 435

- 1. 311
- 2. 307
- 3. 313
- 4. 309

**Ans:**

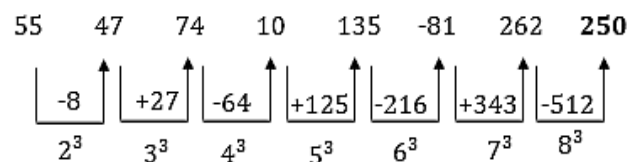


**Ex: What number should replace question Mark (?) in the series given below.**

55, 47, 74, 10, 135, -81, 262, ?

- 1. 774
- 2. -250
- 3. 343
- 4. -343

**Ans:**



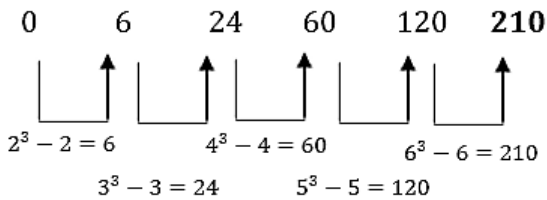
**Ex: Find the missing number in the following series:**

121, 337, ?, 1321, 2185

- 1. 713
- 2. 720
- 3. 721
- 4. 737



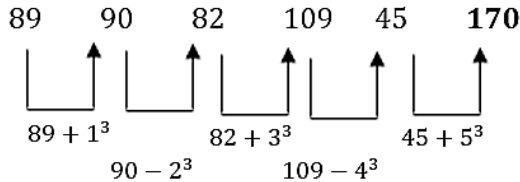
Ans:



Ex: Which number will replace the question mark (?) in the following series?

89, 90, 82, 109, 45, ?

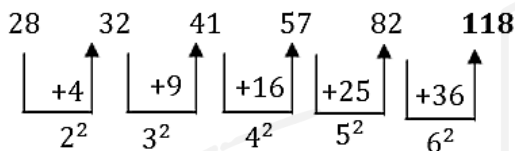
Ans:



Ex: Which number will replace the question mark (?) in the following series?

28, 32, 41, 57, 82, ?

Ans:

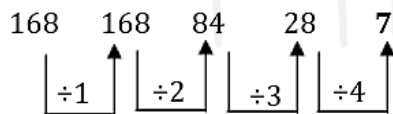


### Type-5 Division Based Decreasing Series

Ex: Which number will replace the question mark (?) in the following number series?

168, 168, 84, 28, ?

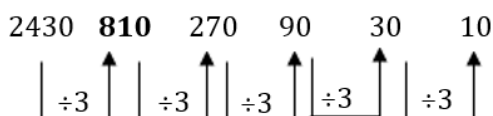
Ans:



Ex: Which number will replace the question mark (?) in the following series?

2430, ?, 270, 90, 30, 10

Ans:



### Type-6 Mixed Number Series

Ex: Find the next terms

11, 13, 17, 19, 23, \_?

- |       |       |
|-------|-------|
| 1. 27 | 2. 29 |
| 3. 31 | 4. 33 |

Ans:

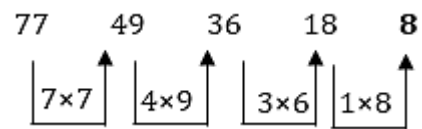
- 11 → Prime number  
 13 → Prime number  
 17 → Prime number  
 19 → Prime number  
 23 → Prime number  
 Next prime number = 29

Ex: What will come in place of the question mark (?) in the following series?

77, 49, 36, 18, ?

- |       |       |
|-------|-------|
| 1. 10 | 2. 12 |
| 3. 8  | 4. 16 |

Ans:

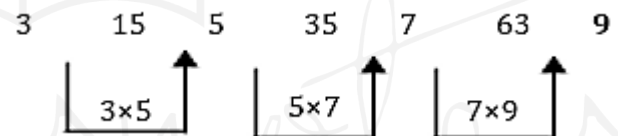


Ex: What will come in place of the question mark (?) in the following series?

3, 15, 5, 35, 7, 63, ?

- |       |        |
|-------|--------|
| 1. 10 | 2. 126 |
| 3. 9  | 4. 84  |

Ans:

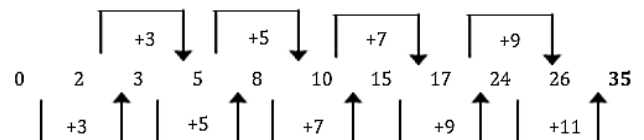


Ex: In the following series, what comes in place of the question mark (?)?

0, 2, 3, 5, 8, 10, 15, 17, 24, 26, ?

- |       |       |
|-------|-------|
| 1. 28 | 2. 30 |
| 3. 32 | 4. 35 |

Ans:



Ex: Select the number from among the given options that can replace the question mark (?) in the following series.

62, 74, 80, 86, 95, ?, 158

- |        |        |
|--------|--------|
| 1. 113 | 2. 100 |
| 3. 108 | 4. 122 |

Ans: The correct answer is 113



