Simplification

Simplification means reducing the expression in a simpler form using various operations while Approximation is simplifying the mathematical expression to its nearest value but not exactly correct. To find the approximate value, we round off the digits in the expression to the nearest value and simplify the expression using BODMAS.

The operations used to simplify follows a fixed order known as BODMAS

where,

B = Bracket
O = of
D = Division
M = Multiplication
A = Addition
S = Subtraction

The simplification and approximation topic is one of the simplest ones in the numerical ability/quantitative aptitude part and simply effective calculation can help candidates answer questions from this section quickly and correctly.

The main purpose behind proposing questions from the approximation and simplification point is to examine the understanding of an applicant to manage with numbers and basic predictions.

Questions are composed to mislead the candidates with extended decimal numbers and computations which may look confusing and complex but this topic is one where a candidate can secure maximum without initiating errors.

The simplification questions can be examined in two styles:

- **Missing numbers –** A given equation in the exam paper would ask the candidates to fill in the blank in that particular equation, provided either on the Left-hand side or Right-hand side.
  For example, 240 – __+100 = 5 × 35 + 265. Here the candidates are required to fill the space with the appropriate options.
- **Simplifying the equation –** Another approach in which the simplification questions may be asked is the direct method of furnishing an equation and solving it to obtain the result.
  For example: 242 – 235 + 90 = ?.
  In such problems, applicants have to respond to what comes in the position of the question mark (?).

Important Terms under Simplification and Approximation

Some important terms related to simplification and approximation are given below.

Vinculum – Vinculum is a horizontal line drawn over a group of terms in a mathematical expression to indicate that they are to be operated on as a single entity by the preceding or following operator.

Brackets – Brackets in simplification are of three types.

- **Round brackets – denoted by the symbols ( )**
- **Curly brackets – denoted by the symbols { }**
- **Box brackets – denoted by the symbols [ ]**

The order in which these brackets are operated is ( ), { } and [ ]. Of means multiplication but it is operated before division.
The operation of adding or subtracting can be interchanged or can be performed simultaneously.

Surds and Indices – A surd is an irrational number that can be expressed with roots, such as $\sqrt{12}$ or $\sqrt[3]{12}$.
An index is a power to which a number is raised and the plural of the index is indices. For example, k12 has an index of 12.

Some Examples

Example : 4 of 2 + 15 ÷ 3 ÷ 5 – 1

Solution :
⇒**Step 1:** 8 + 15 ÷ 3 ÷ 5 – 1
⇒**Step 2:** 8 + 5 ÷ 5 – 1 (In case of multiple division, we start division from the left side)
⇒**Step 3**: 8 + 1 – 1 = 8.

Example : Square of 35?

Solution:
⇒**Step 1:** Divide 35 into 3 / 5.
⇒**Step 2:** The next consecutive digit of 3 is 4. So Multiply 3 with 4. i.e. 12.
⇒**Step 3:** 12 / Square of 5 i.e. 25
Ans: 1225

Example : Square of number 98?

Solution :
⇒Nearest best to 98 = 100. 98 is less than 100 by 2
⇒**Step 1**: Subtract 98 by 2 = 98 – 2 = 96.
⇒**Step 2**: Square of 2 = 04 (Number of digits should be equal to number of zeros in base)

Ans: 9604

Example : Square of number 102?

Solution: Nearest best to 102 = 100. 102 is more than 100 by 2
⇒**Step 1**: Add 102 by 2 = 102 + 2 = 104.

⇒**Step 2**: Square of 2 = 04 (Number of digits should be equal to number of zeros in base)
Ans: 10404.

Example : 64 × 99

Solution :
⇒**Step 1:** 64 – 1 = 63
⇒**Step 2:** Complement of 64 = 100 – 64 = 36
Ans: 6336.

Example : 678 × 999 = ?

Solution :
⇒**Step 1:** 678 – 1 = 677
⇒**Step 2:** Compliment of 678 = 1000 – 678 = 322
Ans: 677322.

EXERCISE

1. Solve 5(1/2) + 6(1/2) - 8(1/4)

A. 2(3/4)

B. 3(3/4)

C. 2(1/4)

D. None of these

2. $10^3 - 3^3 - 2^3/10^2$ =?

A. 9.5

B. 9.62

C. 9.61

D. 9.6

3. $(14)^2 - (.06)^2$

A. 194.36

B. 193.36

C. 195.36

D. None of these

4. 37.5% of 800 – 6.25% of 1600 =?

A. 200

B. 250

C. 275

D. 236

5. $6^3 + 8^3 - 7^3 / 6^2 + 8^3 - 7^2 = ?$

A. 287/385

B. 223/167

C. 385/51

D. 231/378

ANSWER KEY

1. B

2. A

3. D

4. A

5. C

D. 231/378

ANSWER KEY

1. B

2. A

3. D

4. A

5. C

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