
Simplification and Approximation: Concepts, Solved Examples, & Preparation Strategies

2021/04/21

Simplification is a score gaining section in the exam. In this section, you just need to solve expressions using basic rules of simplification. While solving these questions, it is crucial that you must follow the principle of BODMAS. Unlike Simplification questions where we can find the exact output by simplifying the given expression, the approximate output is required in approximation questions. In these questions, there is no need to calculate the exact answer, however, it should be close to the exact answer. In this article, we are going to cover the key concepts of Simplification and Approximation along with the various types of questions, and tips and tricks. We have also added a few solved examples, which candidates will find beneficial in their exam preparation. Read the article thoroughly to clear all the doubts regarding the same.

Also, check [Time and Work](#) concepts here once you are through with Simplification and approximation concepts!

What is Simplification and Approximation?

Simplification means reducing the expression in a simpler form using various operations.

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

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.

If you've learned Simplification and Approximation, you can move on to learn about [Speed, Time and Distance](#) concepts.

Simplification and Approximation Concept

update part and simply creative 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, $240 - __ + 100 = 5 \times 35 + 265$. 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 the 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 the power to which a number is raised and the plural of index is indices. For example, k_{12} has an index of 12.

Important Rules of Simplification and Approximation

Topic	Rules
Product Rule	$a^m \times a^n = a^{m+n}$
Power Rules	$(a^m)^n = a^{m \times n}$ $ab^n = a^n b^n$ $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
Exponent of Zero	$a^0 = 1$
Quotient Rule	$\frac{a^m}{a^n} = a^{m-n}$
Negative Exponent	$a^{-n} = \frac{1}{a^n}$ $\frac{1}{a^{-n}} = a^n$ $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$
Exponent of One	$a^0 = 1$

Tips and Tricks to Solve Simplification/Approximation Questions

Candidates can find different tips and tricks from below for solving the questions related to simplification and approximation. To guarantee that the applicant does not drop marks on this topic.

- If all the fractions have a common denominator, then the integer part and the fraction part can be calculated separately.
- To find the approximate value of an expression containing decimals, just convert the decimals into integers and solve the expression.
- That is, the numbers that are presented in a decimal format, practice a rounded-off value for those numbers. For example, 46.72 can be taken as 47, 21.10 can be taken as 21, and so on.
- Always determine the approximation or simplification problems following the BODMAS rule.
- Memorizing tables at least till 20 can be of great help for the aspirants and would help them save some extra time for the complex question.
- Do not overcomplicate the problems and make sure that the hard calculations require to be skipped in order to work the equations in the shortest time possible.
- Remember the primary important formulas which can be applied in such question:

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

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

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

When you've finished with Simplification and Approximation, you can read about [Ratio and Proportion](#) concepts in depth here!

Important Simplification and Approximation Topics

Learn about some of the important simplification and Approximation Topics with the below table.

Topic	Details
The BODMAS Rule	<p>The order of execution for interpreting an expression is;</p> <p>Simplify the elements inside the Bracket. The second rule suggests working on the exponents and roots Of. Following is the Division, then, Multiplication. The Addition is succeeding and the last one, Subtractions.</p> <p>Resolving a presented problem in the incorrect order will deliver the wrong answer in the examination.</p>
Polynomial Equation (An equation composed up of numbers and variables)	<p>Formulas for determining such equations formulas like $(a + b)^2$, $(a^3 + b^3)$, $(a - b)^2$, $(a + b)^3$ are to be remembered.</p>
Time and Distance	<p>The basic formula of time and distance plays a major role.</p> $s = \frac{d}{t}, d = s \times t, t = \frac{d}{s}$ <p>Here s=speed, d=distance and t=time.</p>
Ratio & Proportion	Primary school level concepts of ratio & proportion are helpful.
Unitary method	Determining the value of a unit first from the given value of a multiple.
Mensuration	Geometric method of measurement of parameters such as area, volume, length, lateral surface area, surface area, total surface area and so on.
Basic Geometry	Elementary academic level concepts of geometry that are concerned with the shapes and sizes of the articles, their corresponding position, and the properties of objects.

$$48.99 \times \sqrt[3]{342.81} \div (6.99)^2 + (12.99)^2 = x$$

Solution 1:

$$\Rightarrow 48.99 \times \sqrt[3]{342.81} \div (6.99)^2 + (12.99)^2 = x$$

$$\Rightarrow 49 \times \sqrt[3]{343} \div (7)^2 + (13)^2 = x$$

$$\Rightarrow 49 \times 7 \div 49 + 169 = x$$

$$\Rightarrow 49 \times (1/7) + 169 = x$$

$$\Rightarrow 7 + 169 = x$$

$$\therefore x = 176.$$

Question 2: 4 of $2 + 15 \div 3 \div 5 - 1$

Solution 2:

$$\Rightarrow \text{Step 1: } 8 + 15 \div 3 \div 5 - 1$$

$$\Rightarrow \text{Step 2: } 8 + 5 \div 5 - 1 \text{ (In case of multiple division, we start division from left side)}$$

$$\Rightarrow \text{Step 3: } 8 + 1 - 1 = 8.$$

Question 3: Square of 35?

Solution:

$$\Rightarrow \text{Step 1: Divide 35 into } 3 / 5.$$

$$\Rightarrow \text{Step 2: The next consecutive digit of 3 is 4. So Multiply 3 with 4. i.e. 12.}$$

$$\Rightarrow \text{Step 3: } 12 / \text{Square of 5 i.e. 25}$$

$$\text{Ans: } 1225$$

Question 4: Square of number 98?

Solution 4:

$$\Rightarrow \text{Nearest best to } 98 = 100. 98 \text{ is less than } 100 \text{ by } 2$$

$$\Rightarrow \text{Step 1: Subtract } 98 \text{ by } 2 = 98 - 2 = 96.$$

$$\Rightarrow \text{Step 2: Square of } 2 = 04 \text{ (Number of digits should be equal to number of zeros in base)}$$

$$\text{Ans: } 9604.$$

Question 5: Square of number 102?

$$\Rightarrow \text{Solution: Nearest best to } 102 = 100. 102 \text{ is more than } 100 \text{ by } 2$$

$$\Rightarrow \text{Step 1: Add } 102 \text{ by } 2 = 102 + 2 = 104.$$

$$\Rightarrow \text{Step 2: Square of } 2 = 04 \text{ (Number of digits should be equal to number of zeros in base)}$$

$$\text{Ans: } 10404.$$

Ans: 6336.

Question 7: $678 \times 999 = ?$

Solution 7:

⇒ **Step 1:** $678 - 1 = 677$

⇒ **Step 2:** Complement of 678 = $1000 - 678 = 322$

Ans: 677322.

Question 8: $78 \times 999 = ?$

Solution 8: Take 78 as 078 and solve normally.

⇒ **Step 1:** $078 - 1 = 077$

⇒ **Step 2:** Complement of 078 = $1000 - 078 = 922$

Ans: 77922.

Question 9: Square of number 988?

Solution 9: Nearest best to 988 = 1000. 988 is less than 100 by 12

⇒ **Step 1:** Subtract 988 by 12 = $988 - 12 = 976$.

⇒ **Step 2:** Square of 12 = 144 (Number of digits should be equal to number of zeros in base)

Ans: 976144.

Exams where Simplification and Approximation is Part of Syllabus

Questions based on Simplification and Approximation come up often in various prestigious government exams some of them are as follows.

- [SBI PO](#), [SBI Clerk](#), [IBPS PO](#), [IBPS Clerk](#)
- [SSC CGL](#), [SSC CHSL](#), [SSC MTS](#)
- [LIC AAO](#), [LIC ADO](#)
- [RRB NTPC](#), [RRB ALP](#)
- [UPSC](#)
- [MPSC](#)
- [KPSC](#)
- [BPSC](#)
- [WBPSC](#)
- Other State Level Recruitment Examinations

If you are checking Simplification and Approximation article, also check the related maths articles in the table below:

We hope you found this article regarding Simplification and Approximation was informative and helpful, and please do not hesitate to contact us for any doubts or queries regarding the same. You can also download the [Testbook App](#), which is absolutely free and start preparing for any government competitive examination by taking the mock tests before the examination to boost your preparation.

Simplification and Approximation FAQs

Q.1 What is Simplification and Approximation?

Ans.1 Details regarding the simplification and approximation can be found above in the article. Kindly go through the article for the same.

Q.2 Where can I find the important rules related to the simplification and approximation?

Ans.2 Important rules related to the simplification and approximation can be found above in the article.

Q.3 How to solve the problem related to simplification and approximation?

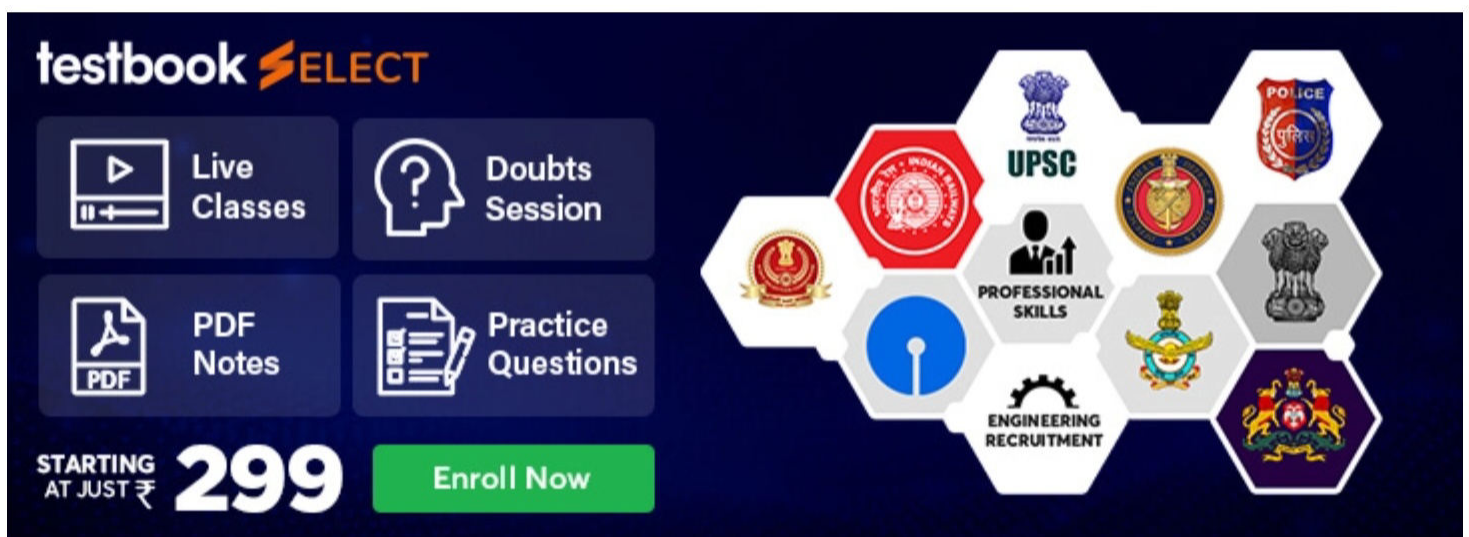
Ans.3 Tips and tricks to solve the problems related to simplification and approximation are given above in the article. Kindly go through the article for the same.

Q.4 Where I will find some of the sample questions related to simplification and approximation?

Ans.4 Various example questions along with their solutions are given above in the article. Kindly go through the article for the same.

Q.5 In which exam questions from simplification and approximation come up?

Ans.5 Simplification and Approximation based questions come in various government competitive examinations on a regular basis. The names of such examinations are given above in the article.



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