









#### Unlocking Precision: A Comprehensive Guide to Approximation

# Introduction:

We use approximation in our daily life every day, we all know how to do it, for example we say 1000 for 999, what we do we simply ignore a comparably small portion.

In mathematical expressions which include division and multiplication of decimal values of large numbers we are stuck. It becomes quite complex to solve these problems, so for solving these we use approximation. We just Round-off the numbers.

When we approximate the final result obtained is not equal to the exact result, but it is very close to the exact result.

Let's try one,

Solving by **BODMAS** rule, as learned earlier

$$\Rightarrow$$
 ? = 32.01 + 128.01 × 1023.99 + 7.99

$$\Rightarrow$$
 ?= 32.01 + 131,080.9599 + 7.99

$$\Rightarrow$$
 ? = 131,120.9599

$$\Rightarrow$$
 10/100 × 1350 + ? = 365

$$\Rightarrow$$
 135 + ? = 365

$$\Rightarrow$$
 ? = 365 - 135  $\Rightarrow$  ? = 230

**E.g.** 
$$78 \times 98 - 25\%$$
 of 1376

$$\Rightarrow$$
 78 × 98  $-$  25/100 × 1376

$$\Rightarrow$$
 7644  $-$  34400/100

$$\Rightarrow$$
 7644 – 344 = 7300 (it requires tedious calculation)

After this tedious calculation ( $128.01 \times 1023.99$ ) without a calculator, we are not left with time, in the exam hall we will prefer to leave this question.

In Approximation, to solve the complex mathematical expression, take the nearest value of numbers given in the expression. Try to make unit digit 0' in most cases.



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**E.g.** 
$$? = 32.01 + 128.01 \times 1023.99 + 7.99$$

Let's try to round off to nearest integer

Or we can say,

$$\Rightarrow$$
 ? =  $2^5 + 2^7 \times 2^{10} + 2^3$ 

$$\Rightarrow$$
 ? =  $2^5 + 2^{17} + 2^3$ 

$$\Rightarrow$$
 ? =  $2^3 (2^2 + 2^{14} + 1)$ 

By calculator we would get 131112.09

Here it is, we got the solution.

**E.g.** 
$$393 \times 197 + 5600 \times 5/4 + 8211.80 = ?$$

$$\Rightarrow$$
 393 × 197 + 5600 × 5/4 + 8211.80 = ?

$$\Rightarrow$$
 390 × 200 + 5600 × 5/4 + 8200 = ?

$$\Rightarrow$$
 390 × 200 + 5600 × 5/4 + 8200 = ?

(By BODMAS rule)

$$\Rightarrow$$
 390 × 200 + 7000 + 8200 = ?

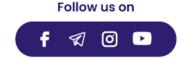
$$\Rightarrow$$
 ? = 93200 (Ans).

We got 92,632.8 by calculator. It is quite near its original value.

**Tip-** For finding 10% of a number simply move the decimal to one digit left.

For finding 25% simply divides the number by 4

#### **Shortcut method for Percentage:**



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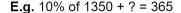






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Sr. No.	Required Percentage (%)	Number divided by
1.	200	1/2
2.	50	2
3.	33.33	3
4.	25	4
5.	20	5
6.	10	10
7.	5	20
8.	1	100



$$\Rightarrow$$
 ? = 365 – 10% of 1350

$$\Rightarrow$$
 ? = 365 - 135.0

$$\Rightarrow$$
 ? = 230.0 (Ans).

**E.g.**  $78 \times 98 - 25\%$  of 1376

 $\Rightarrow$  78 × 98 – 344 (Using approximation and table)

 $\Rightarrow 8000 - 344$ 

 $\Rightarrow$  7656 (Ans).

This can be done in mind without the pen and paper.

**E.g.** 34.02% of 550.09 + ? = 297.07 +  $\sqrt{728.95}$ 

 $\Rightarrow$  34.02% of 550.09 + ? = 297.07 +  $\sqrt{728.95}$ 

 $\Rightarrow$  34% of 550 + ? = 300 +  $\sqrt{729}$ 





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$$\Rightarrow$$
 (25 + 10 – 1)% of 550 + ? = 300 + 27

$$\Rightarrow$$
 25% of 550 + 10% of 550 - 1% of 550 + ? = 327

$$\Rightarrow$$
 137.5 + 55 - 5.5 + ? = 327

$$\Rightarrow$$
 132 + ? = 327

$$\Rightarrow$$
 ? = 327 - 132

$$\Rightarrow$$
 ? = 195 (Ans).

**E.g.** 
$$(? + 9.97) \times 12.8 = 20.12\%$$
 of 1319.97

$$\Rightarrow$$
 (? + 10.00) × 13.0 = 20.00% of 1320.00

$$\Rightarrow$$
 (? + 10.00) × 13.0 = 1/5 × 1320.00

$$\Rightarrow$$
 (? + 10.00) × 13.0 = 264

$$\Rightarrow$$
 (? + 10.00) = 260/13

$$\Rightarrow$$
 ? = 20 - 10

$$\Rightarrow$$
 ? = 10 (Ans)

So this is all for today. Try the questions of this topic. In the next blog, we will discuss some other topics.



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