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,

E.g. ? = 32.01 + 128.01 × 1023.99 + 7.99

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

⇒ ? = 32.01 + 128.01 × 1023.99 + 7.99

⇒ ?= 32.01 + 131,080.9599 + 7.99

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⇒ ? = 131,120.9599

E.g. 10% of 1350 + ? = 365

⇒ 10/100 × 1350 + ? = 365

⇒ 135 + ? = 365

⇒ ? = 365 – 135 ⇒ ? = 230

E.g. 78 × 98 – 25% of 1376

⇒ 78 × 98 – 25/100 × 1376

⇒ 7644 – 34400/100

⇒ 7644 – 344 = 7300 (it requires tedious calculation)

After this tedious calculation (128.01 × 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.

E.g. ? = 32.01 + 128.01 × 1023.99 + 7.99

Let's try to round off to nearest integer

⇒ ?= 32 + 128 × 1024 + 8

Or we can say,

⇒ ? = $2^5 + 2^7 \times 2^{10} + 2^3$

⇒ ? = $2^5 + 2^{17} + 2^3$

⇒ ? = $2^3 (2^2 + 2^{14} + 1)$

⇒ ? = 8 (16389) = 131112

By calculator we would get 131112.09

Here it is, we got the solution.

E.g. 393 × 197 + 5600 × 5/4 + 8211.80 = ?

⇒ 393 × 197 + 5600 × 5/4 + 8211.80 = ?

⇒ 390 × 200 + 5600 × 5/4 + 8200 = ?

⇒ 390 × 200 + 5600 × 5/4 + 8200 = ?

(By BODMAS rule)

⇒ 390 × 200 + 7000 + 8200 = ?

⇒ 78000 + 7000 + 8200 = ?

⇒ ? = 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:

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

E.g. 10% of 1350 + ? = 365

⇒ ? = 365 – 10% of 1350

⇒ ? = 365 – 135.0
⇒ ? = 230.0 (Ans).

E.g. 78 × 98 – 25% of 1376

⇒ 78 × 98 – 344 (Using approximation and table)

⇒ 8000 – 344

⇒ 7656 (Ans).

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

E.g. 34.02% of 550.09 + ? = 297.07 + √728.95

⇒ 34.02% of 550.09 + ? = 297.07 + √728.95

⇒ 34% of 550 + ? = 300 + √729

⇒ (25 + 10 – 1)% of 550 + ? = 300 + 27

⇒ 25% of 550 + 10% of 550 – 1% of 550 + ? = 327

⇒ 137.5 + 55 – 5.5 + ? = 327

⇒ 132 + ? = 327

⇒ ? = 327 – 132

⇒ ? = 195 (Ans).

E.g. (? + 9.97) × 12.8 = 20.12% of 1319.97

⇒ (? + 10.00) × 13.0 = 20.00% of 1320.00

⇒ (? + 10.00) × 13.0 = 1/5 × 1320.00

⇒ (? + 10.00) × 13.0 = 264

⇒ (? + 10.00) = 260/13

⇒ ? = 20 – 10

⇒ ? = 10 (Ans)

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