

Approximation- Quant Study Notes for Competitive Exams

Hello our dear learners, today we are going to learn about approximation. Many of you might have doubts, so let's clear all your problems.

We use approximation in our daily life to ease down our day-to-day work. In mathematical expressions which include division and multiplication of decimal values of large numbers. It becomes quite complex to solve these problems, so to solve these we use approximation.

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.

$$\text{E.g. } ? = 32.01 + 128.01 \times 1023.99 + 7.99$$

Sol: Solving by BODMAS rule, as learned earlier

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

$$? = 32.01 + 131,080.9599 + 7.99 = 131,120.9599$$

$$\text{E.g. } 10\% \text{ of } 1350 + ? = 365$$

$$10/100 \times 1350 + ? = 365$$

$$135 + ? = 365$$

$$? = 365 - 135$$

$$? = 230$$

$$\text{E.g. } 78 \times 98 - 25\% \text{ of } 1376$$

$$78 \times 98 - 25/100 \times 1376$$

$$7644 - 34400/100 = 7644 - 344$$

$$7300 \text{ (it requires tedious calculation)}$$

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.

$$\text{E.g. } ? = 32.01 + 128.01 \times 1023.99 + 7.99$$

Let's try to round off to nearest integer

$$? = 32 + 128 \times 1024 + 8$$

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Or we can say,

$$? = 25 + 27 \times 210 + 23$$

$$? = 25 + 217 + 23$$

$$? = 23 (22 + 214 + 1)$$

$$? = 8 (16389) = 131112$$

By calculator we would get 131112.09

Here it is, we got the solution.

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

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

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(By BODMAS rule)

$$390 \times 200 + 7000 + 8200 = ?$$

$$78000 + 7000 + 8200 = 93200 \text{ (Ans.)}$$

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.

Short- cut method for percentage

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| Sr. No. | Required Percentage (%) | Number divided by |
|---------|-------------------------|-------------------|
| 1. | 200 | $\frac{1}{2}$ |
| 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. $78 \times 98 - 25\%$ of 1376

$78 \times 98 - 344$ (Using approximation and table)

$8000 - 344 = 7656$ (Ans.)

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

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

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

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

25% of 550 + 10% of 550 - 1% of 550 + ? = 327



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

$$132 + ? = 327$$

$$? = 327 - 132 = 195 \text{ (Ans.)}$$

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

$$(? + 10.00) \times 13.0 = 20.00\% \text{ of } 1320.00$$

(Using approximation)

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

$$(? + 10.00) \times 13.0 = 264$$

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

(Using approximation)

$$? = 20 - 10 = 10 \text{ (Ans.)}$$

Hope your doubts are clear. Practice some more questions for better understanding of this topic and stay connected.