Quantitative Aptitude:

SIMPLIFICATION

We are going to learn all about VBODMAS rule, what is it, where to use it along with some mind-blowing formulae which will transfer you in a human calculator.

E.g. $221 \div 13 \times \sqrt{576} + (10)^2 = ?$

We are completely clueless about where to start right now, so let's start from left

$\Rightarrow$ 221 ÷ 13 × 24 + 100 = ?

$\Rightarrow$ 221 ÷ 13 × 124 = ?

$\Rightarrow$ 221 ÷ 1612 = ?

$\Rightarrow$ 7.290 (Approx.)

Which is wrong, so how to approach these types of questions?

Is there a specific method to approach them?

Yes, **VBODMAS** rule.

VBODMAS RULE

Full form of VBODMAS is

Sr.no.	Alphabet	Significance
1.	V	Vinculum or Bar
2.	B	Brackets
3.	O	Of
4.	D	Division
5.	M	Multiplication
6.	A	Addition
7.	S	Subtraction

For every question we have to do each step from up to bottom

Let's take an example and try to solve it.

E.g. $221 \div 13 \times \sqrt{576} + (10)^2 = ?$

Step- 1: First try to **Solve** $\sqrt{576}$ and $(10)^2$

$\Rightarrow 221 \div 13 \times 24 + 100 = ?$

Step-2: **Division**

$\Rightarrow 221 \div 13 \times 24 + 100 = ?$

$\Rightarrow 17 \times 24 + 100 = ?$

Step-3: Multiplication

$\Rightarrow 17 \times 24 + 100 = ?$

$\Rightarrow 408 + 100 = ?$

Step-4: **Addition**

⇒ 408 + 100 = ?

⇒ 508 (Ans).

Tip- While solving brackets first open small () then curly {} and last big brackets []

E.g. $[(2211 ÷ 67)^2 – 21 × \sqrt{(256)}] ÷ (549 – 213) = ? ÷ 1344$

Let's apply VBODMAS rule here

Step-1: Let's **Solve** $\sqrt{256}$

⇒ $[(2211 ÷ 67)^2 - 21 × 16] ÷ (549 - 213) = ? ÷ 1344$

Step-2: Start opening the **Brackets**

⇒ $[(2211 ÷ 67)^2 - 21 × 16] ÷ (549 – 213) = ? ÷ 1344$

⇒ $[(33)^2 – 21 × 16] ÷ 336 = ? ÷ 1344$

Step-3: Now we have to first simplify equation in bracket then open it by VBODMAS

⇒ $[1089 – 21 × 16] ÷ 336 = ? ÷ 1344$

⇒ $[1089 – 336] ÷ 336 = ? ÷ 1344$

Step-4: Now open the bracket

⇒ $[1089 – 336] ÷ 336 = ? ÷ 1344$

⇒ $753 ÷ 336 = ? ÷ 1344$

Step-5: **Division**

⇒ $753 ÷ 336 = ? ÷ 1344$

⇒ $753 × 1344 ÷ 336 = ?$

⇒ $753 × 4$

⇒ 3012 (Ans).

E.g. 1/6 of 355 of 1/5 of 2160 + √3969 - 448.98 = ?

Step -1: first solve **Vinculum**

1/5 of 2160

⇒ 1/5 × 2160

⇒ 432

And

1/6 of 355

⇒ 355/6

So, we got,

⇒ 355/6 of 432 + 37 – 448.98

Step-2: Solve **Of**

⇒ 355/6 of 432 + 37 – 448.98

⇒ 355/6 × 432 + 37 – 448.98

Step-3: **Division**

⇒ 355 × 72 + 37 – 448.98

Step-4: **Multiplication**

⇒ 355 × 72 + 37 – 448.98

⇒ 25560 + 37 – 448.98

Step-5: **Addition**

⇒ 25560 + 37 – 448.98

⇒ 25597 – 448.98

Step-6: Subtraction

⇒ 25597 – 448.98

⇒ 25,148.02 (Ans).

E.g. 28/9 ×144/12 ÷ 17/5 + 13/17

Step-1: By BODMAS rule we would firstly (D) **Divide**

⇒ 28/9 × 12÷ 17/5 + 13/17

⇒ 28/9 × 60/17 + 13/17

Step-2: **Multiplication**

⇒ 28/9 × 60/17 + 13/17

⇒560/51 + 13/17

Step-3 **Addition**

⇒ (560 + 39)/51

⇒599/51 (Ans).

As we saw by using this concept it would lead to the correct answer however the question is how tedious.

APPROXIMATION

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,

(*Beginner*)

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

⇒ ?= 32.01 + 131,080.9599 + 7.99

⇒ ? = 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.

(Expert)

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,

⇒ ? = $2^5 + 2^7 × 2^{10} + 2^3$

⇒ ?= $2^5 + 2^{17} + 2^3$

⇒ ?= $2^3 (2^2 + 2^{14} + 1)$

⇒ = 8 (16389)

⇒?=131112

⇒ ? = 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.

Yeah it is effective.

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

For finding 25% simply divides the number by 4

<u>Shout-cut method for Percentage</u>

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

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

⇒ ? = 365 – 10% of 1350

⇒ ? = 365 – 135.0
        (By table)

⇒ ? = 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 use of 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
    (Using approximation)

⇒ (? + 10.00) × 13.0 = 1/5 × 1320.00

⇒ (? + 10.00) × 13.0 = 264

⇒ (? + 10.00) = 260/13
    (Using approximation)

⇒ ? = 20 − 10

⇒ ? = 10 (Ans).

So we can solve tedious questions of **Banking** in our minds with less time.

I hope you guys like this. I tried to cover every variety of questions that appear in your **Banking Exam**. Do practice these concepts at home as time is the key in exam hall to success, these short tricks would help you to achieve high scores.

EXERCISE:

1. What approximate value will come in place of question mark (?) in the following question?

$[(3\sqrt{1300}) - 72.97] + (\sqrt{50} - 16.07)^2 = (?)^2 - 52.92$

1. 12

2. 11

3. 9

4. 13

5. 8

2. What will come in place of question mark (?) in the following question?

$5.4 \div 1.8 \div 1.5 \times 13.4 + 8 = ?$

1. 34.8

2. 46.2

3. 51.2

4. 40.2

5. 36.5

3. What approximate value will come in place of question mark (?) in the following question?

$\sqrt[3]{5.832} + 35\%$ of $6500 - ?\%$ of $1250 = 222.8$

1. 164

2. 18

3. 174

4. 194

5. 154

4. What approximate value will come in place of question mark (?) in the following question?

7000 ÷ 19 – ?% of 649.91 = – 4182

1. 600

2. 700

3. 300

4. 800

5. 500

5. Direction: What approximate value should come in place of question mark (?).

$(4/5)/(96/600) + (8/7)/(16/546) + 17^2 + 7^3 = ?^2$

1. 27

2. 28

3. 24

 4. 26

5. 21

ANSWERS AND SOLUTIONS:

1. Correct answer is **option 4** i.e. **13**

$[(3\sqrt{1300}) – 72.97] + (\sqrt{50} – 16.07)^2 = (?)^2 – 52.92$

$\Rightarrow [3 × 36.05 – 72.97] + (7.07 – 16.07)^2 = (?)^2 – 53$

Taking the approximate values;

$\Rightarrow [108 - 73] + (- 9)^2 = (?)^2 - 53$

$\Rightarrow 35 + 81 + 53 = ?^2$

$\Rightarrow ?^2 = 169$

$\Rightarrow ? = 13$

2. The correct answer is **Option 1** i.e. **34.8**

Explanation:

We will apply BODMAS rule here:

B = Bracket

O = Of

D = Division

M = Multiply

A = Addition

S = Subtraction

$5.4 \div 1.8 \div 1.5 \times 13.4 + 8 = ?$

$\Rightarrow 3 \div 1.5 \times 13.4 + 8 = ?$

$\Rightarrow 2 \times 13.4 + 8 = ?$

$\Rightarrow 34.8$

3. Correct answer is **option 1** i.e. **164**

$\sqrt[3]{5.832} + 35\% \text{ of } 6500 - ?\% \text{ of } 1250 = 222.8$

$\Rightarrow 1.8 + 0.35 \times 6500 - ? \times 12.5 = 222.8$

$\Rightarrow 1.8 + 2275 - ? \times 12.5 = 222.8$

$\Rightarrow ? \times 12.5 = 2276.8 - 222.8$

⇒ ? × 12.5 = 2054

⇒ ? = 164.32 ≈ 164

4. Correct answer is **option 2** i.e. **700**

7000 ÷ 19 – ?% of 649.91 = – 4182

⇒ 368.4 – ?% of 649.91 = – 4182

Taking the approximate values:

⇒ 368 + 4182 = ?% of 650

⇒ ?% of 650 = 4550

⇒ ? = 4550 ÷ 650 × 100

⇒ ? = 700

5. The correct answer is **Option 4** i.e. **26**

⇒ $(4/5)/(96/600) + (8/7)/(16/546) + 17^2 + 7^3 = ?^2$

⇒ $4/5 × 600/96 + 8/7 × 546/16 + 289 + 343 = ?^2$

⇒ $120/24 + 78/2 + 289 + 343 = ?^2$

⇒ $5 + 39 + 289 + 343 = ?^2$

⇒ $387 + 289 = ?^2$

⇒ $?^2 = 676$

⇒ $?^2 = 26^2$

⇒ ? = 26

RATIOS AND PROPORTIONS

We are going to discuss **Ratio and Proportion** and questions based on it, which appear in your **Banking Exams**. This is a concept that would be used in different other topics too so make sure your concepts are tightened up.

Let's first understand what is **Ratio and Proportion**,

When two or more similar quantities are compared, then to represent this comparison, ratios are used. The ratio between x and y can be represented as x : y, where x is called **antecedent,** and y is called the **consequent.**

x : y or x / y

A proportion is an expression which states that two ratios are equal e.g. 3 / 12 = 1 / 4.

3 : 12 = 1 : 4

RATIO

As in ratios, two quantities are compared so quantities should be in the same unit and the ratio has no unit.

TIP- In ratios a : b is different from b : a.

Dividing a number in a Ratio

Let 'A' be a given number. The given ratio is $a_1 : a_2$, so 'A' has to be divided in the ratio of $a_1 : a_2$,

First part = $a_1 / (a_1 + a_2) \times A$

Second part = $a_2 / (a_1 + a_2) \times A$

Since 'A' has to be divided in the ratio so (first part + second part) = A

E.g. Dividing 3200 among P, Q, and R in the ratio of 5 : 2 : 9, find the amount received by R.

Amount received by R = 9 / (5 + 2 + 9) × 3200 = 9 / 16 × 3200

⇒1800 (**Ans**.)

E.g. In a 40 liters mixture acetic acid and sodium acetate are in the ratio 3 : 1; find the amount of sodium acetate solution to be added to make the ratio 2 : 3.

[SBI PO PRELIMS (2017)]

Ans- Sodium acetate in the solution = 1 / (1 + 3) × 40 = 1 / 4 × 40 = 10

Rest → 40 - 10 = 30

Let 'x' amount be added of sodium acetate in the solution to make ratio 2:3

⇒ 30 / (10 + x) = 2 / 3

⇒ 90 = 20 + 2x

⇒ 2x = 70

⇒ x = 35 (**Ans**).

E.g. The ratio between the ages of A and B is 3 : 5 and the sum of their ages are 56 years. The ratio between their ages 7 years ago was?

Ans- Age of A = 3 / (3 + 5) × 56 = 3 / 8 × 56 = 21

⇒ Age of B = 56 – 21 = 35

⇒ 7 years ago age of A and B was = 21 – 7, 35 – 7 = 14, 28

⇒ Ratio will be = 14 / 28 = 1 / 2 (**Ans**.)

We can do this calculation in mind too by taking less than a minute and save time for other questions

Comparison of Ratios

E.g. Which is greater, 5 / 8, or 3 / 8?

Ans- We can easily compare both sides as the denominator is the same for both;

⇒ 5 > 3 so, 5 / 8 > 3 / 8

E.g. Which is greater, 4 / 7, or 5 / 9?

Ans- As denominator of both fractions are different so we simply can't compare, let's simplify them

As 4 / 7 = 0.5714 and 5 / 9 = 0.5555

As 0.57 > 0.55 → 4 / 7 > 5 / 9 (**Ans**.)

- For comparing two fractions we can simply convert both ratios in such a way that both ratios have the same denominator, then compare their numerator, the fraction with greater numerator will be greater.
- For comparing two fractions we can simply convert both ratios in such a way that both ratios have the same numerator, then compare their denominator, the fraction with greater denominator will be lesser.

E.g. Which is greater, 4 / 7, or 5 / 9?

Let's try to make the numerator equal

⇒ (4 × 5) / (7 × 5) = 20 / 35; (5 × 4) / (9 × 4) = 20 / 36

As 35 < 36 so 4 / 7 > 5 / 9 (**Ans**.)

For solving questions related to ratios we need to compare two quantities, let's discuss some properties of comparison;

(i) a : b > c : d if ad > bc

   a : b < c : d if ad < bc

   a : b = c : d if ad = bc

E.g. Which is greater, 4 / 7, or 5 / 9?

Ans- Let a / b = 4 / 7 and c/d = 5 / 9

⇒ ad = 4 × 9, bc = 7 × 5

⇒ ad = 36, bc = 35

⇒ ad > bc, 4 / 7 > 5 / 9 (**Ans**.)

Without any cumbersome calculation, we arrived at our solution.

PROPORTION

An equality or two ratios is called a proportion and we say that the four numbers are in proportion.

If $a / b = c / d$ or $a : b :: c : d$

Here a and d are called **extremes** (extreme terms) and b,c are called **Means** (middle terms)

Or, $a \times d = b \times c$.

If $a : b :: b : c$, then these numbers a, b, c are said to be in **Continued Proportion**.

$\Rightarrow a : b :: b : c$

$\Rightarrow a : b = b : c$

$\Rightarrow a \times c = b \times b$

$\Rightarrow ac = b^2$

$\Rightarrow c = b^2 / a$

Where **b** is called **Mean Proportional** and **c** is called **Third Proportional**.

E.g. 8. Mean proportional of 'a' and 'b'.

Let it be 'x'

$\Rightarrow a : x :: x : b$

$\Rightarrow a \times b = x \times x$

$\Rightarrow ab = x^2$

$\Rightarrow x = \sqrt{(ab)}$

E.g. The ratio of incomes of Raman and Gagan is $4 : 3$ and the ratio of their expenditures is $3 : 2$. If each person saves Rs 2500, then find their incomes and expenditures.

Let the income of Raman be 4x and income of Gagan is 3x

$\Rightarrow$ Expenditures of Raman = 4x – 2500

$\Rightarrow$ Expenditures of Gagan = 3x – 2500

According to question,

$\Rightarrow (4x - 2500) / (3x - 2500) = 3 / 2$

$\Rightarrow 8x - 5000 = 9x - 7500$

⇒ x = 2500

Income of Gagan,

⇒ 3x = 3 × 2500 = 7500

Income of Raman,

⇒ 4x = 4 × 2500 = 10000

Expenditures of Gagan,

⇒ 3x – 2500 = 7500 – 2500 = 5000

Expenditures of Raman,

⇒ 4x – 2500 = 10000 – 2500 = 7500.(**Ans**.)

This is a very common question in the quant section and it took very much time for solving too, so let's find a better alternative for this.

TIP- The incomes of two persons are in the ratio of a:b and their expenditures are in the ratio of c:d. If each of them saves X, then their incomes are given by,

(X(d – c)) / (ad – bc) × a and (X(d – c)) / (ad – bc) × b, respectively.

Their expenditures are given by,

(X(b – a)) / (ad – bc) × c and (X(b – a)) / (ad – bc) × d, respectively.

Let's try to solve the previous question by this method

⇒ Income of Raman = X(d – c) / (ad – bc) × a = 2500(2 – 3) / (8 – 9) × 4 = 10000

⇒ Income of Gagan = X(d – c) / (ad – bc) × b = 2500(2 – 3) / (8 – 9) × 3 = 7500

⇒ Expenditures of Raman = X(b – a) / (ad – bc) × c = 2500(3 – 4) / (8 – 9) × 3 = 7500

⇒ Expenditures of Raman = X(b – a) / (ad – bc) × d = 2500(3 – 4) / (8 – 9) × 2 = 5000 (**Ans**.)

Yes, we got the solution and it's fast if we remember the formula correctly.

E.g. A and B are partners in a business. They invest in the ratio 5 : 6, at the end of 8 months B withdraws, if they receive profit at the end of the year in the ratio of 5 : 9 find how long A's investment was used? [**SBI PO PRELIMS (2016)**]

Let A's investment was used for X months

Given, the ratio of invest (A : B) = 5 : 6

⇒ Ratio of time = X : 8

⇒ Ratio of profit = 5X / 48 = 5 / 9

So,

⇒ X = 48 / 9 = 16 / 3 Months.

As we saw there are numerous types of questions that could be formed by the use of **Ratios and Proportions** but the concepts are the same in all.