

BANK EXAMS

QUANTITATIVE APTITUDE

Simplifications

Simplifications are very important in Bank Exams. In Quantitative Aptitude / Numerical Ability section, about 40 - 50% of questions in clerical exam and about 20 - 25% of questions in Probationary Officers exam will be of simplifications.

All simplification questions are to be solved based on BODMAS rule only.

B – Bracket

O – Of

D – Division

M – Multiplication

A – Addition

S – Subtraction

When there are more brackets in the given expression, simplification should be started from inner most bracket to the outer most bracket.

Some Important Identities

$$\star (a + b)^2 = a^2 + b^2 + 2ab$$

$$\star (a - b)^2 = a^2 + b^2 - 2ab$$

$$\star (a + b)(a - b) = a^2 - b^2$$

$$\star (a + b)^3 = a^3 + b^3 + 3a^2b + 3ab^2$$

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

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

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

$$\star (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac$$

$$\star a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ac)$$

Laws of Indices

★ $a^m \times a^n = a^{m+n}$

e.g.: $8^4 \times 8^3 = 8^{4+3} = 8^7$

★ $\frac{a^m}{a^n} = a^{m-n}$

e.g.: $\frac{3^8}{3^2} = 3^{8-2} = 3^6$

★ $(a^m)^n = a^{mn}$

e.g.: $(5^3)^2 = 5^{3 \times 2} = 5^6$

★ $(ab)^m = a^m \times b^m$

e.g.: $(3 \times 4)^2 = 3^2 \times 4^2$

★ $a^{-m} = \frac{1}{a^m}$

e.g.: $3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

★ $\sqrt[m]{a} = a^{1/m}$

e.g.: $\sqrt[9]{15} = 15^{1/9}$

★ $a^{m/n} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$

e.g.: $27^{2/3} = \sqrt[3]{27^2} = \sqrt[3]{729} = 9$ or $(\sqrt[3]{27})^2 = (3)^2 = 9$

★ $a^0 = 1$

e.g.: $9^0 = 1$

Squares and Cubes of numbers are very useful in simplification questions. Following table gives squares and cubes of 25 numbers

No.	Square	Cube
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000
11	121	1331
12	144	1728
13	169	2197
14	196	2744
15	225	3375
16	256	4096
17	289	4913
18	324	5832
19	361	6859
20	400	8000
21	441	9261
22	484	10648
23	529	12167
24	576	13824
25	625	15625

Some Model Questions

Directions (Q.No.1 - 20): What should come in place of question mark (?) in the following questions?

1.
$$\frac{1.87 \times 1.87 \times 1.87 + 0.13 \times 0.13 \times 0.13}{1.87 \times 1.87 + 0.13 \times 0.13 - 0.13 \times 1.87} = ?$$

- 1) 2 2) 1.74 3) 1 4) 0.24
5) None of these

2. $750 \div 375 \times (25)^2 = ?$

1) 1250

2) 1260

3) 1350

4) 1230

5) 1290

3. $(25)^3 \div 625 \times 5^5 = (5)^?$

1) 8

2) 6

3) 7

4) 2

5) None of these

4. $8476 - 2334 + 3297 = ? + 6447$

1) 2872

2) 2992

3) 2912

4) 3012

5) None of these

5. $23 \times 15 \div 25 - ? + 48.2 = -35$

1) 68

2) 86

3) 91

4) 97

5) 94

6. $?% \text{ of } 450 - 118 = 8$

1) 33

2) 28

3) 45

4) 67

5) None

7. $(64)^2 \times 8^2 = (?)^2$

1) 2

2) 3

3) 8

4) 64

5) 32

8. $3\frac{1}{5} \div \frac{4}{5} \times 223 = ?$

1) 768

2) 868

3) 892

4) 829

5) None

9. $(6 \times 15) - (8 \times 6) - 18 = ? \div 3$

1) 24

2) 64

3) 12

4) 36

5) None

10. $1587 + 2277 = ? \div 69$

1) 49

2) 44

3) 73

4) 56

5) None

11. $120 \times ? = 10 \div \frac{126 \times 0.5}{63 \times 2} \times 12$

- 1) 12 2) 4 3) 3 4) 2
5) 6

12. $\frac{2.4 \times 2.4 - 1.6 \times 1.6}{0.8} = ?$

- 1) 12 2) 4 3) 2 4) 1
5) 5

13. $483 \div 23 \div 3 = ?$

- 1) 14 2) 6 3) 7 4) 3
5) None

14. $\frac{((12)^{-2})^2}{((12)^2)^{-2}} = ?$

- 1) 12 2) 144 3) 64 4) 24
5) None

15. $\frac{5}{22}$ of 110% of 750 = ?

- 1) 375 2) 187.5 3) 125 4) 175.5
5) 132.5

16. $(15 \times 35.2 \times 4) \div 12 = (?)^2 - 20$

- 1) 7 2) 28 3) 14 4) $\sqrt{14}$
5) None

17. $17^{10.5} \times 17^{5.1} \div 17^{1.2} = 17^?$

- 1) 14.4 2) 7.2 3) 6.6 4) 4.2
5) None of these

18. $14.2 \times 8.5 \times 12.4 = ?$

- 1) 1392.68 2) 1496.68 3) 1493.78 4) 1529.38
5) None of these

19. $\sqrt{2809} = \sqrt{? + 4}$

- 1) 49 2) 7 3) 2401 4) 53
5) None of these

20. $\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{2}{3}$ of 2520 = ?

- 1) 30 2) 90 3) 225 4) 120
5) None of these

ANSWERS

1-1; 2-1; 3-3; 4-2; 5-4; 6-2; 7-1; 8-3; 9-5; 10-4; 11-4; 12-2; 13-3; 14-5; 15-2; 16-3; 17-1; 18-2; 19-3; 20-5.

EXPLANATIONS

1. $\frac{1.87 \times 1.87 \times 1.87 + 0.13 \times 0.13 \times 0.13}{1.87 \times 1.87 + 0.13 \times 0.13 - 0.13 \times 1.87} = ?$

This is like in the form of $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

∴ Answer is $1.87 + 0.13 = 2$

2. $\frac{750 \times 25 \times 25}{375} = 1250$

3. $(25)^3 \div 625 \times 5^5 = (5)^?$

$\Rightarrow \frac{5^6 \times 5^5}{5^4} = 5^?$

$\Rightarrow 5^6 + 5 - 4 = 5^?$

$\Rightarrow ? = 7$

4. $? = 8476 - 2334 + 3297 - 6447 = 2992$

5. $23 \times 15 \div 25 - ? + 48.2 = -35$

$\Rightarrow ? = \frac{23 \times 15}{25} + 48.2 + 35 = 97$

6. $\frac{?}{100} \times 450 = 126$

$$\Rightarrow ? = \frac{126 \times 100}{450} = 28$$

7. $(64)^2 \div 83 = (?)^2$

$$\Rightarrow ?^3 = \frac{64 \times 64}{8 \times 8 \times 8} = 8 = 23$$

$$\Rightarrow ? = 2$$

8. $3 \frac{1}{5} \div \frac{4}{5} \times 223 = ?$

$$\Rightarrow \frac{16}{5} \times \frac{5}{4} \times 223$$

9. $(6 \times 15) - (8 \times 6) - 18 = ? \div 3$

$$\Rightarrow 90 - 48 - 18 = ? \div 3$$

$$\Rightarrow ? = 72$$

10. $? = \frac{1587 + 2277}{69} = 56$

11. $120 \times ? = 10 \div \frac{126 \times 0.5}{63 \times 2} \times 12$

$$\Rightarrow 120 \times ? = 10 \div \frac{1}{2} \times 12$$

$$\Rightarrow ? = \frac{240}{120} = 2$$

12. $\frac{2.4 \times 2.4 - 1.6 \times 1.6}{0.8} = ?$

$$\Rightarrow ? = \frac{(2.4)^2 - (1.6)^2}{2.4 - 1.6} = 2.4 + 1.6 = 4$$

$$\left[\frac{a^2 - b^2}{a - b} = a + b \right]$$

13. $483 \div 23 \div 3$

$$\Rightarrow 483 \frac{1}{23} \times \frac{1}{3} = 7$$

14. $\frac{((12)^{-2})^2}{((12)^2)^{-2}} = ?$

$$\Rightarrow ? = \frac{\left(\frac{1}{144}\right)^2}{(144)^{-2}} = \frac{(144)^2}{(144)^2} = 1$$

15. $\frac{5}{22}$ of 110% of 750

$$\Rightarrow \frac{5}{22} \times \frac{110}{100} \times 750 = 187.5$$

16. $(15 \times 35.2 \times 4) \div 12 = (?)^2 - 20$

$$\Rightarrow ?^2 = \frac{15 \times 35.2 \times 4}{12} + 20$$

$$\Rightarrow ?^2 = 176 + 20 = 196 = 14^2$$

$$? = 14$$

17. $17^{10.5} \times 17^{5.1} \div 17^{1.2} = 17^?$

$$\Rightarrow 17^{10.5 + 5.1 - 1.2} = 17^?$$

$$\Rightarrow ? = 10.5 + 5.1 - 1.2 = 14.4$$

19. $\sqrt{2809} = \sqrt{? + 4}$

20. $\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{2}{3}$ of 2520

$$\frac{3}{4} \times \frac{5}{7} \times \frac{2}{3} \times 2520 = 900$$

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