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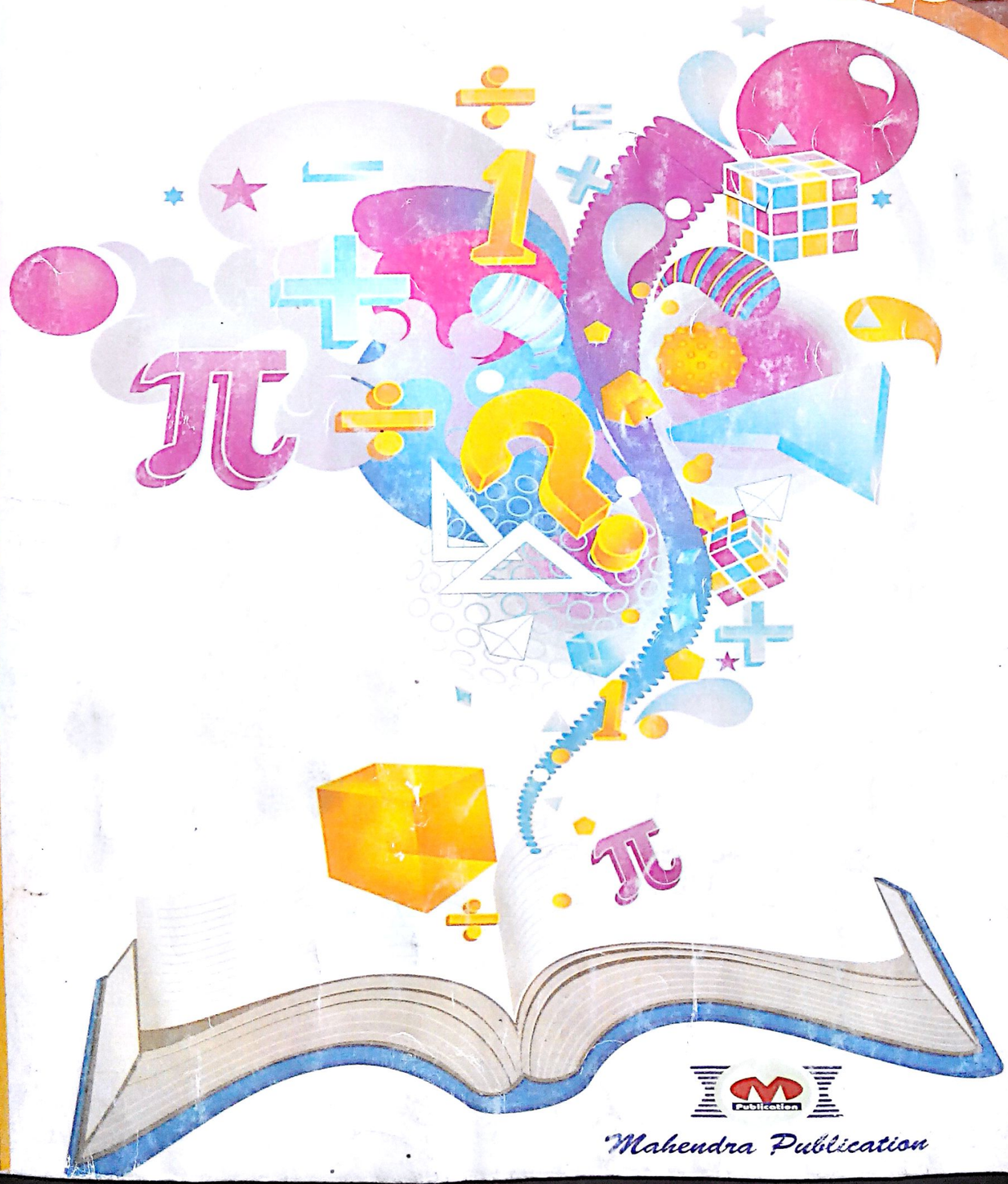
MASTER IN QUANTITATIVE APTITUDE

VOL-1



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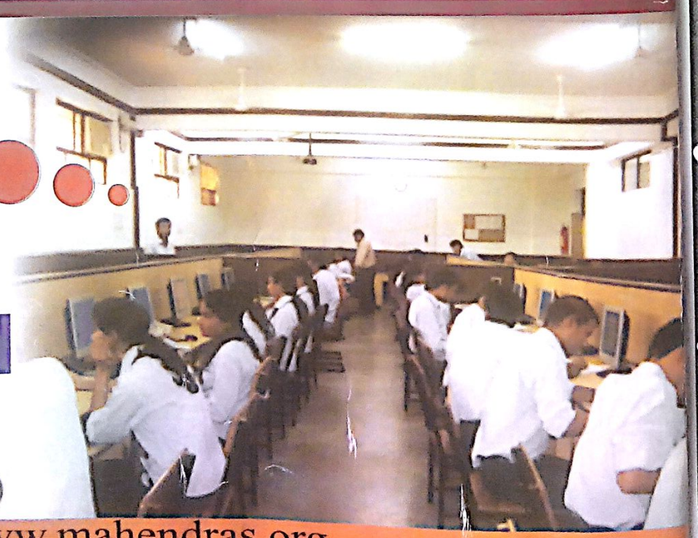

PREFACE.

...

We are now living in a world which is technology-driven. Day by day, the pattern of examination alongwith its criteria for selection is becoming tougher and tougher, with the demand for qualified professionals on a rise. With this increasing pressure, one has to be efficient but not at the cost of accuracy.

Now-a-days, an examinee is made to face an objective type or multiple choice questions. For a number of candidates preparing for competitive examinations like PO, Assistant and other exams, the subject of Quantitative Aptitude is frightening.

Quantitative Aptitude is a subject which can help a candidate score high. the pattern of questions appearing in various examination in this section has undergone radical changes in the last few years. The direct and simple questions are being replaced by some lengthy or tricky brain-teasers. This calls for a change in its approach of attempting those questions. This book has attempted to motivate and encourage the candidates to have a better grasping power as the key factor in tackling these examinations because rather than having a deeper knowledge in mathematics, it is the strategy to crack the problems quickly and accurately.

If this book will be able to guide the students to get his/her final selection in PO and other competitive examinations, we shall have the satisfaction of knowing that our labour has well been rewarded.

Any suggestion to improvement of this book qualitatively (including printing errors, if any) will be most welcomed and these will be incorporated in the next issues.

AUTHORS

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CHAPTER-1

SIMPLIFICATION

Helping Hands :

1. Digits - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
2. Types of numbers.
   - (i) Natural numbers. = {1, 2, 3, 4,.....}
   - (ii) Whole numbers = {0, 1, 2, 3, 4.....}
   - (iii) Integers = {....., -3, -2, -1, 0, 1, 2, 3,.....}
   - (iv) Real numbers = {----, 2.8, -2, -10, 1, 1.9,--2, 3, 3.12, 3.13-----}
   - (v) Even numbers = {2, 4, 6,---------}
   - (vi) Odd numbers = {1, 3, 5, 7----------}
   - (vii) Prime numbers = {2, 3, 5, 7, 11, 13, 17, 19,------}
3. $(a+b)^2 = a^2 + 2ab + b^2$

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

   $a^2 - b^2 = (a+b).(a-b)$

   $(a+b)^3 = a^3 + b^3 + 3ab\,(a+b)$

   $(a-b)^3 = a^3 - b^3 - 3ab\,(a-b)$

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

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

(I) ADDITION & SUBTRACTION

Ex-1. ? = 8+88+888+8888+88888

? = 8(1+11+111+1111+11111)

? = 8(12345) ⇒ 98760

Ex-2. ? = 0.8 + 0.88 + 0.888 + 0.8888 + 0.88888

? = 8(0.1+0.11+0.111+0.1111+0.11111)

? = 8(0.54321) ⇒ 4.34568

Ex-3. 8.8 + 8.88 + 8.888 + 8.8888 + 8.88888 = ?

First we can calculate decimal number and then whole no.

From Ex-2.

8(0.54321) = 4.34568

and 8+8+8+8+8 i.e. 8×5=40

Therefore, 40+4.34568 = 44.34568

Ex-4. 8456+3891+4560 = ?

Ans = 16907

Ex-5. 3.981+14.34+12.5= ?

First we can balance the number of decimal digits and then use elimination method.

i.e. 3.981 +14.340 + 12.500 = ?

Ans = 30.821

Ex-6. 5638 - 4131 + 8112 - 6888 = ?

Ans = 2731

Ex-7. 8123-5688 + 3471 (-?) = 4314

First we transfer the ? from left to right hand side and number 4314 from right to left hand side and then use elimination method.

8123-5688 +3471- 4314 = ?

Ans = 1592

(II) MULTIPLICATION

(A) 100-Base (Near about 100)

Type-I. When both numbers are less than 100.

(1). -8 -7
92×93

(-8) + (-7) / (-8) × (-7)
-15 +56
100
85

Ans = 8556

First we check and compare to 100 we find that first number is less by 8.

i.e. (-8) and 2nd number is also less by 7 (i.e. -7).

Rule - The right hand side part should be always positive and two digits number.

II. -2 -4
98×96

(-2) + (-4) / (-2) × (-4) = +08
-6
100
+94

Ans = 9408

III. -15 -8
85 × 92

(-15) + (-8) / (-15) × (-8) = +120
= -23
100
77
78 20
carry

Ans = 7820

Type-II.(When both numbers are more than 100)

I. +4 +12
104 × 112

(+4)+(+12) / (+4) × (+12)
+16 +48
100
116

Ans = 11648

II. +2 +3
102 × 103

(+2) + (+3) / (+2) × (+3)
+5 = +06
100
105

Ans. = 10506

III. +17 +7
117 × 107

(+17) + (+7) / (+17) × (+7)
= +24 +119
100
124
125 19

Ans. 12519

Type-III.(When first number is more than 100 and other one is less than 100)

I. +8 -6
108 × 94

(+8) + (-6) / (+8) × (-6)
= +2 -48
100 100
102
101 52

Ans. = 10152

II. +2 -4
102 × 96

(+2) + (-4) / (+2) × (-4)
= -2 -08
100 100
98
97 92

Ans. 9792

III. +18 -8
118 × 92

(+18) + (-8) / (+18) × (-8)
= +10 = -144
100 200
110
108 56

Ans = 10856

200 Base (near about 200)

Type-I. When both numbers are less than 200.

I. -4 -8
196 × 192

(-4) + (-8) / (-4) × (-8)
= -12 = +32
200
+188
×2
376

Ans. 37632

Type-II. When both numbers are more than 200.

I.

$$\begin{array}{c} +8 \quad +11 \\ 208 \times 211 \end{array}$$

(+8) + (+11) = +19 | (+8) × (+11) = +88

200
219
×2
438

Ans. 43888

Same as.....

Type-III. When one number is more than and other one is less than 200

I.

$$\begin{array}{c} +12 \quad -2 \\ 212 \times 198 \end{array}$$

(+12) + (-2) = +10 | (+12) × (-2) = - 24

200
210
×2
420
419 | 76

100

Ans. 41976

Same as.....

Similarly we can use 300, 400, ...1000.....base multiplication.

Some Special Types

I. When sum of unit digit is 10 and remaining digit is same.

Exp-I. 43 × 47 = 4 × (4+1) / 3×7
= 4 × 5 / 21
= 20 / 21
Ans = 2021.

Exp-II. 72 × 78 = 7×8 / 2 × 8
= 56 / 16
Ans = 5616

Exp-III. 104 × 106 = 10 × (10 +1) / 4 × 6
= 10 × 11 / 24
= 110 / 24
Ans = 11024

2. When sum of ten's digit is 10 and unit digit is same

Exp-I. 46 × 66
= (4 × 6) + 6 / 6 × 6
= 24 + 6 / 36
= 30 / 36
Ans = 3036

Exp-II. 83 × 23
= (8 × 2) + 3 / 3 × 3
= 19 / 09
Ans = 1909

Exp-III. 92 × 12
= (9 × 1) + 2 / 2 × 2
= 11/04
Ans = 1104

3. When unit digit is 5 in both the numbers and difference between both number is 10

Exp-I. 75 × 65
= 6 × (7 + 1) / 75
= 48 / 75
Ans = 4875

Exp-II. 45 × 35
= 3 × (4+1) / 75
= 15 / 75
Ans = 1575

Exp-III. 105 × 95
= 9 × (10 + 1) / 75
= 99 / 75
Ans = 9975

4.

$25 \rightarrow 5^2 \rightarrow \frac{100}{2^2} = \frac{100}{4}$

$125 \rightarrow 5^3 \rightarrow \frac{1000}{2^3} = \frac{1000}{8}$

$625 \rightarrow 5^4 \rightarrow \frac{10000}{2^4} = \frac{10000}{16}$

ie.

$25 \rightarrow = \frac{100}{4}$

$125 \rightarrow = \frac{1000}{8}$

$625 \rightarrow = \frac{10000}{16}$

Remember this

Exp-I. 64 × 125
$= 64 \times \frac{1000}{8}$
Ans = 8000

Exp-II. 192 × 625
$= 192 \times \frac{10000}{16}$
= 12 × 10000
Ans = 1,20,000

Exp-III. 84 × 25
$= 84 \times \frac{100}{4}$
= 2100

(III) SQUARE AND SQUARE ROOTS

Square of 1-50 numbers

1^2	=	1	26^2	=	676
2^2	=	4	27^2	=	729
3^2	=	9	28^2	=	784
4^2	=	16	29^2	=	841
5^2	=	25	30^2	=	900
6^2	=	36	31^2	=	961
7^2	=	49	32^2	=	1024
8^2	=	64	33^2	=	1089
9^2	=	81	34^2	=	1156
10^2	=	100	35^2	=	1225
11^2	=	121	36^2	=	1296
12^2	=	144	37^2	=	1369
13^2	=	169	38^2	=	1444
14^2	=	196	39^2	=	1521
15^2	=	225	40^2	=	1600
16^2	=	256	41^2	=	1681
17^2	=	289	42^2	=	1764
18^2	=	324	43^2	=	1849
19^2	=	361	44^2	=	1936
20^2	=	400	45^2	=	2025
21^2	=	441	46^2	=	2116
22^2	=	484	47^2	=	2209
23^2	=	529	48^2	=	2304
24^2	=	576	49^2	=	2401
25^2	=	625	50^2	=	2500

Type-I. Formula Method

We know that

$(a+b)^2 = a^2 + 2ab + b^2$ i.e. $(a/b)^2 = a^2 / 2ab / b^2$

Ex-1. $(56)^2$
$= (5/6)^2$
$= 5^2 / 2 \times 5 \times 6 / 6^2$
= 25 / 60 / 36
= 31 / 3 / 6
= 3136

We break number in two parts i.e. 5 & 6 and follow the rule of $(a+b)^2 = a^2 / 2ab / b^2$

Ex-2. $(92)^2$
$= (9/2)^2$
$= 81 / {}^{3}6 / {}^{0}4$
= 8464

Ex-3. Find the square of 112

I. Method :

(We break 112 in two parts like that 11/2)

$(11/2)^2 = 11^2 / 2 \times 11 \times 2 / 2^2$

121 / 44 / 4
= 125 / 4 / 4
Ans. = 12544

II. Method :

(We break 112 in two parts like that 1 / 12)

$(1/12)^2 = 1^2 / 2 \times 1 \times 12 / 12^2$

= 1 / 24 / 144
= 1 / 25 / 44
Ans = 12544

Ex-4. Find the square of 211

$(2 / 11)^2 = 2^2 / 2 \times 2 \times 11 / 11^2$

$= 4 / 44 / 121$

Ans. 44521

In $(998)^2$ — the above rule is failed

Now we can use Base-method.....

100-Base Method (When the number is near about 100).

Type-I :

(When number is less than 100).

Ex-1. $(96)^2$

In this example we can use above method but we also use 100 base method.

Let see in this example 96 is less than 100 by 4.

Find the square of 4

Subtract 4 from 96.

$96^2 = (96-4) / 4^2$

$96^2 = 92 / 16$

$96^2 = 9216$

Ex-2. $98^2 = (98-2) / 2^2$

$= 96 / 04$

$98^2 = 9604$

Ex-3. $(85)^2 = (85-15) / 15^2$

$= 70 / 25$

$= 72 / 25$

$85^2 = 7225$

Type-II :

(When the number is more than 100)

Ex-1. $(108)^2 = 108 + 8 / 8^2$

$= 116 / 64$

$(108)^2 = 11664$

Since 108 is more than 100 by 8 we add 8 to 108.

Ex-2. $(103)^2 = 103 + 3 / 3^2$

$= 106 / 09$

$(103)^2 = 10609$

Since base is 100 therefore right part always be in two digit.

Ex-3. $(112)^2 = 112 + 12 / 12^2$

$= 124 / 144$

$(112)^2 = \underline{125}\ \underline{44}$

200 - Base Method (Near about 200)

Type-III :

(When the number is less than 200)

Ex-1. $= (192)^2 = 192 - 8 / 8^2$

$= 184 / 64$
$\times 2$

$= 368 / 64$

$(192)^2 = 368\ 64$

Because of 200 base we multiply 184 × 2

Ex-2. $(198)^2 = 198 - 2 / 2^2$

$= 196 / 04$

$= 392 / 04$

$(198)^2 = 39204$

Ex-3. $(185)^2 = 185 - 15 / 15^2$

$= 170 \quad 225$
$\times 2$

$= 340 / 225$

$= 342 / 25$

$= 34225$

Similarly we can use 200, 300--------base method.

Type-IV :

1000 base (When the number is near about 1000)

Ex-1. $(998)^2 = 998 - 2 / 2^2$

$= 996 / 004$

$(998)^2 = 996004$

Since base is 1000 therefore Right hand side part one in three digit.

Ex-2. $(1012)^2 = 1012 + 12 / 12^2$

$= 1024 / 144$

$(1012)^2 = 1024144$

Ex-3. $(1008)^2 = 1008 + 8 / 8^2$

$= 1016 / 064$

$(1008)^2 = 1016064$

Special Type :

When unit place of the number is 5.

Ex-1. $75^2 = 7 \times 8 / 5^2$

$= 56 / 25$

$75^2 =$ **5625**

Ex-2. $85^2 = 8 \times 9 / 5^2$

$= 72 / 25$

$(85)^2 =$ **7225**

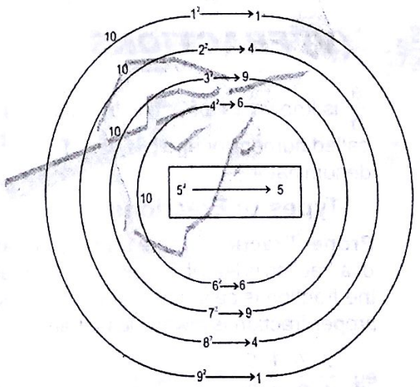
Ex-3. $105^2 = 10 \times 11 / 5^2$

$= 110 / 25$

$(105)^2 =$ **11025**

Square Roots

See the given table :



Last digit of	1^2	is	1
Last digit of	2^2	is	4
Last digit of	3^2	is	9
Last digit of	4^2	is	6
Last digit of	5^2	is	5
Last digit of	6^2	is	6
Last digit of	7^2	is	9
Last digit of	8^2	is	4
Last digit of	9^2	is	1

ie. We can find last digit 1 only when (Squaring 1 or 9) 10

We can find last digit 4 only when (Squaring 2 or 8) 10

We can find last digit 9 only when (Squaring 3 or 7) 10

We can find last digit 6 only when (Squaring 4 or 6) 10

We can find last digit 5 only when (Squaring 5 only)

Perfect square :

" If last digit of any number are 1, 4, 9, 6, 5 then it may be perfect square.

Ex-1. 25 — is a perfect square because it is a square of 5

i.e. $5^2 = 25$

36 — is a perfect square because it is a square of 6

i.e., $6^2 = 36$

64 — is a perfect square because it is a square of 8

i.e., $8^2 = 64$

74 — is not a perfect square because 74 is not a square of a perfect number.

Non-perfect square :

If last digit of any number are 2, 3, 7, 8 then this number is called non-perfect square.

Ex-1. Find the $\sqrt{2601}$

$\sqrt{2601}$ = ?

= 5   1 or 9   51   59

$\boxed{5^2} \le 26 \le \boxed{6^2}$

5 × (5+1) = 30

less

Ans = 51

Rules :

- For unit place of the answer we see that last digit of the question i.e. 1 (see the above table)
- For the ten's place of the ans. we always take smaller number whose square is most nearest to 26.
  (i.e. 5)
- In the above process we find two ans. i.e. 51 or 59
- We multiply ten digit number to next number
  i.e. 5 × 6 = 30)
- now compare 26 to 30 (we find that 26 is less than 30).
- Therefore in both the ans. 51 and 59 the least ans is correct.

Other example.

Ex-2. $\sqrt{9216}$ = ?

= 9   4 or 6   94   96

$\boxed{9^2} \le 92 \le \boxed{10^2}$

9 × (9+1)
= 9× 10 = 90

Since 92 is greater than 90 therefore in both the ans. 96 is correct.

Ex-3. $\sqrt{125\ 44}$ = ?

= 11   2 or 8   11 2   11 8

$\boxed{11^2} \le 125 \le \boxed{12^2}$

Now 11 × 12 = **132**

125 is less than 132

∴ 112 is correct answer.

(IV) CUBE & CUBE ROOT

Special Note for cube : Learn cube of 1 to 25 only for the competitive exams.

Cube of the numbers:

1^3	=	1	14^3	=	2744
2^3	=	8	15^3	=	3375
3^3	=	27	16^3	=	4096
4^3	=	64	17^3	=	4913
5^3	=	125	18^3	=	5832
6^3	=	216	19^3	=	6859
7^3	=	343	20^3	=	8000
8^3	=	512	21^3	=	9261
9^3	=	729	22^3	=	10648
10^3	=	1000	23^3	=	12167
11^3	=	1331	24^3	=	13824
12^3	=	1728	25^3	=	15625
13^3	=	2197			

Ex-1. **Cube root :**

$\sqrt[3]{12167}$ = ?

$\sqrt{12\ 167}$ 7   343

$\boxed{2} \le 12 \le \boxed{3}$

= 2   3

Ans = 23

[Take the number whose cube is nearest to 12]

Ex2. $\sqrt[3]{175\ 616}$ 6^3 = 216

Ans = 5   6   Ans = 56

$\boxed{5^3} \le 175 \le \boxed{6^3}$

(V) FRACTIONS

$\frac{a}{b}$ is known as a fraction in which a is called numerator and b is called denominator.

Types of Fractions

I. **Proper Fraction :** If the numerator part of a fraction is less than denominator then the fraction is called proper fraction and proper fraction is always less than 1.

eg. $\frac{3}{4}, \frac{7}{9}, \frac{1}{2}, \frac{5}{9}$.....etc

II. ***Improper fraction :*** If the numerator of a fraction is greater than denominator then the fraction is called improper fraction.

Improper fraction is always greater than 1.

$\frac{5}{4}, \frac{3}{2}, \frac{7}{5}, \frac{11}{8}$, ...etc.

III. ***Mixed Fraction :***

(a) Mixed with proper fraction : When a proper fraction is mixed with a whole number known as mixed with proper fraction.

eg. $4\frac{3}{4}, 8\frac{1}{2}, 11\frac{5}{7}$.....

(b) Mixed with Improper fraction :

When a improper fraction is mixed with a whole number, known as mixed with improper fraction.

eg. $8\frac{7}{2}, 4\frac{5}{3}, 8\frac{9}{8}$, ...etc.

Rules :

I. $8 + \frac{3}{7} = 8\frac{3}{7}$

II. $8 + \frac{7}{3} = 8 + 2\frac{1}{3} = 10\frac{1}{3}$

III. $8 - \frac{3}{7} = 7 + \left(1 - \frac{3}{7}\right) = 7 + \frac{4}{7} = 7\frac{4}{7}$

IV.

$8 - \frac{7}{3} = 8 - \left(2\frac{1}{3}\right) = 6 - \frac{1}{3} = 5 + \left(1 - \frac{1}{3}\right) = 5\frac{2}{3}$

Ex-1. $4\frac{1}{2} - \frac{5}{8} + 12\frac{1}{4} - 3\frac{7}{8} = ?$

$(4+12-3) + \left(\frac{1}{2} - \frac{5}{8} + \frac{1}{4} - \frac{7}{8}\right) = ?$

$13 + \frac{(4-5+2-7)}{8} = ?$

$13 + \left(\frac{-6}{8}\right) = ?$

$13 - \frac{3}{4} = ? \Rightarrow 12\frac{1}{4} = ?$

Ex-2. $12\frac{1}{3} - \frac{8}{9} + \frac{11}{3} - 4\frac{14}{9} = ?$

$12\frac{1}{3} - \frac{8}{9} + 3\frac{2}{3} - 5\frac{5}{9} = ?$

$(12+3-5) + \left(\frac{1}{3} - \frac{8}{9} + \frac{2}{3} - \frac{5}{9}\right) = ?$

$10 + \left(\frac{3-8+6-5}{9}\right) = ?$

$10 - \frac{4}{9} = ?$

$9\frac{5}{9} = ?$

Ex-3. $6\frac{5}{6} \times 5\frac{1}{3} + 17\frac{2}{3} \times 4\frac{1}{2} = ?$

$\frac{41}{6} \times \frac{16}{3} + \frac{53}{3} \times \frac{9}{2} = ?$

$\frac{328}{6} + \frac{159}{3} = \frac{656+1431}{18} = \frac{2087}{18}$

$115\frac{17}{18} = ?$

(VI) VBODMAS RULE

V → Vinculum means bar as (-)
B → Bracket- () {} and then [ ]
O → of
D → Division [÷]
M → Multiplication [×]
A → Addition [+]
S → Subtraction [-]

The word **'VBODMAS'** represents the order of calculation i.e. order of signs

Ex-1. 35 ÷ 7 × 5 = ?

Sol. According to the order of **VBODMAS**, first we solve division and then multiplication

i.e. 35 ÷ 7 × 5 = ?

5 × 5 = ?

? = 25

Ex-2. 35 ÷ 5 of 7 = ?

Sol. According to the order of **VBODMAS**, first we solve 'of' and then division.

i.e. 35 ÷ 5 of 7 = ?

35 ÷ 35 = ?

? = 1

Ex-3 48 ÷ 12 of 2 + [3 + 17 × 2] = ?

Sol. 48 ÷ 24 + 37 = ?

2 + 37 = ?

? = 39

Ex-4. 2 ÷ 2 ÷ 2 ÷ 2 ÷ 2 ÷ 2 = ?

Sol. $\frac{2}{2\times2\times2\times2\times2} = ?$

$? = \frac{1}{16}$

Ex-5. 2 ÷ 2 ÷ 2 ÷ 2 ÷ 2 of 2 = ?

Sol. 2 ÷ 2 ÷ 2 ÷ 2 ÷ 4 = ?

$\frac{2}{2\times2\times2\times4} = ?$

$? = \frac{1}{16}$

Ex-6. 2 ÷2 ÷ 2 ÷ 2 ÷ 2 × 2 = ?

Sol. $\frac{2}{2\times2\times2\times2}\times 2 = ?$

$? = \frac{1}{4}$

Ex-7. 5 ÷ 5 ÷ 5 + 5 ÷ 5 ÷ 5 = ?

Sol. $\frac{5}{5\times5} + \frac{5}{5\times5} = ?$

$\frac{1}{5} + \frac{1}{5} = ?$

$? = \frac{2}{5}$

Some more formulae based on Indices.

I. $(a^m)^n = a^{mn}$

II. $a^m \div a^n = a^{m-n}$

III. $a^m \times a^n = a^{m+n}$

IV. $a^m = b^m \Rightarrow a = b$

V. $a^m = a^n \Rightarrow m = n$

VI. $a^0 = 1$

Ex-8. $8^{12} \div 16^2$ of $32^3 \times \sqrt{256} = 2^?$

Sol. $(2^3)^{12} \div (2^4)^2$ of $(2^5)^3 \times 16 = 2^?$ ..... $\{(a^m)^n = a^{mn}\}$

$2^{36} \div 2^8$ of $2^{15} \times 2^4 = 2^?$

$2^{36-23+4} = 2^?$

$2^{17} = 2^?$

? = 17

Ex-9. 108 ÷ 36 of $\frac{1}{4} + \frac{2}{5} \times 3\frac{1}{4} = ?$

Sol. $108 \div 9 + \frac{2}{5} \times \frac{13}{4} = ?$

$12 + \frac{13}{10}$

$? = 13\frac{3}{10}$

Ex-10. $33\frac{1}{3}$% of 633 + 129 = $66\frac{2}{3}$% of ?

Sol. $\frac{1}{3} \times 633 + 129 = \frac{2}{3} \times ?$

$(211 + 129) \times \frac{3}{2} = ?$

$? = 340 \times \frac{3}{2} = 170 \times 3 = 510$

EXERCISE

SIMPLIFICATION

Q.1-52. 50 + 75 + 150 + 250 + 350 = ?
(1) 578 (2) 587 (3) 785 (4) 875 (5) None of these

Q.2. 236 + 738 + 876 + 1002 = ?
(1) 2582 (2) 2852 (3) 5282 (4) 5228 (5) None of these

Q.3. 5002 + 2005 + 7667 = ?
(1) 14764 (2) 14476 (3) 14674 (4) 14467 (5) None of these

Q.4. 3583 + 7862 - 3216 = ?
(1) 8292 (2) 8229 (3) 9228 (4) 8290 (5) None of these

Q.5. 5762 - 3528 + 7656 = ?
(1) 9890 (2) 9089 (3) 9809 (4) 9990 (5) None of these

Q.6. 7229 - 3216 - 1738 = ?
(1) 2257 (2) 2275 (3) 2250 (4) 2527 (5) None of these

Q.7. 4 + 44 + 444 + 4444 + 44444 = ?
(1) 49308 (2) 49380 (3) 40398 (4) 49083 (5) None of these

Q.8. 0.44444 + 0.4444 + 0.444 + 0.44 + 0.4 = ?
(1) 18.7382 (2) 21.7384 (3) 22.7285 (4) 2.17284 (5) None of these

Q.9. 4 + 444 + 4444 + 44444 = ?
(1) 49336 (2) 49363 (3) 49633 (4) 49366 (5) None of these

Q.10. 4 + 44 + 444 + 44444 = ?
(1) 44369 (2) 44936 (3) 44639 (4) 44396 (5) None of these

Q.11. 23.70 + 87.87 + 63.37 = ?
(1) 174.49 (2) 174.94 (3) 170.49 (4) 174.40 (5) None of these

Q.12. 176.5 + 382.7 + 928.28 = ?
(1) 1487.84 (2) 1478.48 (3) 1487.48 (4) 1478.84 (5) None of these

Q.13. 236.05 - 316.87 + 238.85 = ?
(1) 158.03 (2) 185.03 (3) 158.30 (4) 158 (5) None of these

Q.14. 2176 × 316 = ?
(1) 687616 (2) 768661 (3) 687166 (4) 786166 (5) None of these

Q.15. 3333 × 333 × 33 = ?
(1) 36626337 (2) 36626267 (3) 36626762 (4) 63378728 (5) None of these

Q.16. 2.005 × 1.07 × 8.67 = ?
(1) 18.60 (2) 18.6001 (3) 18.6001845 (4) 18.61 (5) None of these

Q.17. 5005 ÷ 35 ÷ 5 = ?
(1) 28.06 (2) 28.6 (3) 26.8 (4) 28.66 (5) None of these

Q.18. 2164 ÷ 4×3=?
(1) 1632 (2) 1623 (3) 1263 (4) 2163 (5) None of these

Q.19. $\frac{2}{3}$ of $\frac{5}{4}$ of $\frac{6}{7}$ of 2170 = ?
(1) 1050 (2) 1550 (3) 1005 (4) 1555 (5) None of these

Q.20. $2\frac{1}{7} + 3\frac{6}{7} + 5\frac{1}{6} = ?$
(1) $11\frac{6}{7}$ (2) $11\frac{1}{6}$ (3) $11\frac{5}{6}$ (4) $10\frac{5}{6}$ (5) None of these

Q.21. Simplify: $12.05 \times 5.4 \div 0.6$

(1) 107.45 (2) 108.45 (3) 107.54 (4) 108.54 (5) None of these

Q.22. Find the value of x in the following equation :

$$\frac{1728 \div x}{36 \times 2} = 2$$

(1) 10 (2) 11 (3) 12 (4) 13 (5) None of these

Q.23. If $\frac{x}{y} = \frac{6}{5}$, the value of $\frac{x^2 + y^2}{x^2 - y^2}$

(1) $\frac{54}{11}$ (2) $\frac{48}{11}$ (3) $\frac{14}{55}$ (4) $\frac{14}{11}$ (5) None of these

Q.24. Find the value of $4 - \cfrac{5}{1 + \cfrac{1}{3 + \cfrac{1}{2 + \frac{1}{4}}}}$

(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{5}$ (5) None of these

Q.25. If $\cfrac{2x}{1 + \cfrac{1}{1 + \frac{x}{1-x}}} = 1$, then find the value of x.

(1) $\frac{2}{3}$ (2) $\frac{1}{3}$ (3) $\frac{5}{6}$ (4) $\frac{1}{4}$ (5) None of these

Q.26. $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{7} + \frac{1}{14} + \frac{1}{28}$ is equal to :

(1) 2 (2) 2.5 (3) 3 (4) 3.5 (5) None of these

Q.27. $1\frac{3}{4} + 5\frac{1}{3} + 3\frac{2}{5} = ?$

(1) $9\frac{2}{5}$ (2) $9\frac{29}{60}$ (3) $10\frac{2}{5}$ (4) $10\frac{29}{60}$ (5) None of these

Q.28. $20\frac{1}{2} + 30\frac{1}{3} - 15\frac{1}{6} = ?$

(1) $34\frac{1}{6}$ (2) $35\frac{2}{3}$ (3) $35\frac{5}{6}$ (4) $45\frac{1}{3}$ (5) None of these

Q.29. $\frac{1}{\left(2\frac{1}{3}\right)} + \frac{1}{\left(1\frac{3}{4}\right)}$ is equal to :

(1) $\frac{7}{14}$ (2) $\frac{12}{49}$ (3) $4\frac{1}{12}$ (4) $12\frac{1}{4}$ (5) None of these

Q.30. $5\frac{5}{6} - 3\frac{8}{9} - ? = 1$

(1) $\frac{2}{3}$ (2) $\frac{3}{2}$ (3) $\frac{17}{18}$ (4) 3 (5) None of these

Q.31. $2\frac{3}{4} \div \frac{8}{3} \div 1\frac{1}{12} = ?$

(1) $\frac{39}{48}$ (2) $1\frac{1}{4}$ (3) $\frac{169}{144}$ (4) $\frac{13}{12}$ (5) None of these

Q.32. $4\frac{1}{2} \times 4\frac{1}{3} - 8\frac{1}{3} \div 5\frac{2}{3} = ?$

(1) $\frac{7}{17}$ (2) $1\frac{33}{34}$ (3) 8 (4) $18\frac{1}{34}$ (5) None of these

Q.33. $\frac{4335}{4?24} \div 1\frac{7}{8} = \frac{289}{528}$

(1) 1 (2) 2 (3) 8 (4) 0 (5) None of these

Q.34. $5\frac{1}{3} - 3\frac{2}{3} \div 1\frac{1}{3} \div ? + 3\frac{1}{5} \div 1\frac{1}{5} = 7$

(1) $1\frac{1}{2}$ (2) $2\frac{1}{3}$ (3) $3\frac{1}{4}$ (4) $7\frac{1}{3}$ (5) None of these

Q.35. $9 - 1\frac{2}{9}$ of $3\frac{3}{11} \div 5\frac{1}{7}$ of $\frac{7}{9} = ?$

(1) $\frac{5}{4}$ (2) 8 (3) $8\frac{32}{81}$ (4) 9 (5) None of these

Q.36. $\frac{5}{6} \div \frac{6}{7} \times ? - \frac{8}{9} \div 1\frac{3}{5} + \frac{3}{4} \times 3\frac{1}{3} = 2\frac{7}{9}$

(1) $\frac{7}{8}$ (2) $\frac{6}{7}$ (3) 1 (4) 0 (5) None of these

Q.37. $\cfrac{\frac{2}{3} - \frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{2} + \frac{1}{3}}}{\times 3\frac{1}{3} + \frac{5}{6}} = ?$

(1) $\frac{7}{18}$ (2) $\frac{49}{54}$ (3) $\frac{2}{3}$ (4) $\frac{1}{6}$ (5) None of these

Q.38. Simplify : $\cfrac{\frac{1}{3} + \frac{3}{4}\left(\frac{2}{5} - \frac{1}{3}\right)}{1\frac{2}{3} \text{ of } \frac{3}{4} - \frac{1}{4} \text{ of } \frac{4}{5}}$

(1) $\frac{1}{63}$ (2) $\frac{23}{40}$ (3) $\frac{23}{55}$ (4) $\frac{23}{63}$ (5) None of these

Q.39. The simplified value of $\cfrac{\frac{1}{3} \div \frac{1}{3} \times \frac{1}{3}}{\frac{1}{3} \div \frac{1}{3} \text{ of } \frac{1}{3}} - \frac{1}{9}$ is

(1) 0 (2) $\frac{1}{9}$ (3) $\frac{1}{3}$ (4) 1 (5) None of these

Q.40. The value of $\dfrac{\frac{1}{2}\div\frac{1}{2}\text{ of }\frac{1}{2}}{\frac{1}{2}+\frac{1}{2}\text{ of }\frac{1}{2}}$ is

(1) 1 (2) $1\frac{1}{3}$ (3) $2\frac{2}{3}$ (4) 3 (5) None of these

Q.41. $\dfrac{3\frac{1}{4}-\frac{4}{5}\text{ of }\frac{5}{6}}{4\frac{1}{3}\div\frac{1}{5}-\left(\frac{3}{10}+21\frac{1}{5}\right)}$

(1) $\frac{1}{6}$ (2) $2\frac{7}{12}$ (3) $15\frac{1}{2}$ (4) $21\frac{1}{2}$ (5) None of these

Q.42. $\dfrac{7\frac{1}{2}-5\frac{3}{4}}{3\frac{1}{2}+?}\div\dfrac{\frac{1}{2}+1\frac{1}{4}}{1\frac{1}{5}+3\frac{1}{2}}=0.6$

(1) $4\frac{1}{3}$ (2) $4\frac{1}{2}$ (3) $4\frac{2}{3}$ (4) 0 (5) None of these

Q.43. 3034 - (1002÷20.04) is equal to :

(1) 2543 (2) 2984 (3) 2993 (4) 3029 (5) None of these

Q.44. 52.416 ÷ 18.72 + 6.28 = ?

(1) 2.09664 (2) 8.36 (3) 9.08 (4) 9.80 (5) None of these

Q.45. $8\frac{2}{7}$ of 1568 + 265.75 = ? + 2455.60 :

(1) 10354.15 (2) 10578.15 (3) 10802.15 (4) 11250.15 (5) None of these

Q.46. 5.8 × 2.5 + 0.6 × 6.75 + 139.25 = ?

(1) 157.30 (2) 157.80 (3) 158.40 (4) 160.30 (5) None of these

Q.47. $8\frac{1}{4}-4\frac{1}{5}+2.8+\frac{4}{?}-2.32=5.33$

(1) 0.05 (2) 0.5 (3) 5 (4) 1 (5) None of these

Q.48. The value of 0.008 × 0.01 × 0.0072 ÷ (0.12×0.0004) is :

(1) 0.012 (2) 0.12 (3) 1.02 (4) 1.2 (5) None of these

Q.49. 2.375 × 5.22 ÷ 0.87 - 1.425 × 0.02=?

(1) 0.142215 (2) 1.42215 (3) 14.2215 (4) 14.23150 (5) None of these

Q.50. 0.2 + 0.2 - 0.2 ÷ 0.2 × (0.2×0.2), on simplification, gives

(1) 0.04 (2) 0.2 (3) 0.36 (4) 1 (5) None of these

Q.51. 11.6+9.28÷0.464-0.2828÷0.07 = ?

(1) 9.2 (2) 9.56 (3) 27.2 (4) 27.56 (5) None of these

Q.52. 4.59×1.8÷3.6+5.4 of $\frac{1}{9}-\frac{1}{5}$ = ?

(1) 2.695 (2) 2.705 (3) 3.105 (4) 3.009 (5) None of these

Q.53. if $\frac{a}{3}=\frac{b}{4}=\frac{c}{7}$, then the value of $\frac{a+b+c}{c}$ is:

(1) $\frac{1}{\sqrt{7}}$ (2) $\sqrt{2}$ (3) 2 (4) 7 (5) None of these

Q.54. if 3x + 7 = x^2 + P = 7x + 5, What is the value of P

(1) $\frac{1}{2}$ (2) $8\frac{1}{4}$ (3) $8\frac{1}{2}$ (4) Can't be determined (5) None of these

Q.55. If $\frac{2a+b}{a+4b}=3$, then find the value of $\frac{a+b}{a+2b}$

(1) $\frac{2}{7}$ (2) $\frac{5}{9}$ (3) $\frac{10}{7}$ (4) $\frac{10}{9}$ (5) None of these

Q.56. If (2a + 3b) (2c - 3d) = (2a - 3b) (2c+3d) then

(1) $\frac{a}{b}=\frac{c}{d}$ (2) $\frac{a}{d}=\frac{c}{b}$ (3) $\frac{a}{b}=\frac{d}{c}$ (4) $\frac{b}{a}=\frac{c}{d}$ (5) None of these

Q.57. The value of $\dfrac{1}{2+\dfrac{1}{2+\dfrac{1}{2-\frac{1}{2}}}}$

(1) $\frac{3}{8}$ (2) $\frac{19}{8}$ (3) $\frac{8}{3}$ (4) $\frac{8}{19}$ (5) None of these

Q.58. If $2=x+\dfrac{1}{1+\dfrac{1}{3+\frac{1}{4}}}$, then the value of x is :

(1) $\frac{12}{17}$ (2) $\frac{13}{17}$ (3) $\frac{18}{17}$ (4) $\frac{21}{17}$ (5) None of these

Q.59. The value of $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\ldots\ldots\left(1+\frac{1}{120}\right)$ is :

(1) 30 (2) 40.5 (3) 60.5 (4) 121 (5) None of these

Q.60. When simplified, the product $\left(2-\frac{1}{3}\right)\left(2-\frac{3}{5}\right)\left(2-\frac{5}{7}\right)\ldots\ldots\left(2-\frac{999}{1001}\right)$ is equal to

(1) $\frac{991}{1001}$ (2) $\frac{1001}{13}$ (3) $\frac{1003}{13}$ (4) $\frac{100}{991}$ (5) None of these

Q.61. Find the sum: $\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+\frac{1}{30}+\frac{1}{42}+\frac{1}{56}+\frac{1}{72}+\frac{1}{90}+\frac{1}{110}+\frac{1}{132}$

(1) $\frac{7}{8}$ (2) $\frac{11}{12}$ (3) $\frac{15}{16}$ (4) $\frac{17}{18}$ (5) None of these

Q.62. The sum of the first 35 terms of the series $\frac{1}{2}+\frac{1}{3}-\frac{1}{4}-\frac{1}{2}-\frac{1}{3}+\frac{1}{4}+\frac{1}{2}+\frac{1}{3}-\frac{1}{4}$

(1) $-\frac{1}{2}$ (2) $-\frac{1}{4}$ (3) $\frac{1}{4}$ (4) 0 (5) None of these

Q.63. Simplify :

$10\frac{1}{2}-\left[8\frac{1}{2}+\{7-\overline{6-4}\}\right]\overline{6-4}=2$ (v)

(1) –3 (2) –2 (3) 1 (4) 4 (5) None of these

Q.64. $0.75 \times 0.75 + 0.25 \times 0.75 \times 2 + 0.25 \times 0.25$

(1) 2 (2) 2.5 (3) 1 (4) 3 (5) None of these

Q.65. Simplify: $\dfrac{(0.87)^3 + (0.13)^3}{(0.87)^2 + (0.13)^2 - (0.87 \times 013)}$

(1) 2 (2) 2.5 (3) 1 (4) 3 (5) None of these

Q.66. $\left(\dfrac{?}{18}\right) \times \left(\dfrac{?}{162}\right) = 1$

(1) 9 (2) 18 (3) 54 (4) 36 (5) None of these

Q.67. $\dfrac{(0.55)^2 + (0.07)^2 + (0.027)^2}{(0.055)^2 + (0.007)^2 + (0.0027)^2} = ?$

(1) 100 (2) 10 (3) 1 (4) 1000 (5) None of these

Q.68. $\dfrac{20.25 \times 2.80}{28.35}$

(1) 1 (2) 2 (3) 3
(4) 4 (5) None of these

Q.69. $54 \div 66 \div 33 = ?$

(1) $\dfrac{1}{121}$ (2) $\dfrac{2}{121}$ (3) $\dfrac{3}{121}$
(4) $\dfrac{4}{121}$ (5) None of these

Q.70. $\dfrac{2?9}{4} = \dfrac{916}{16}$

(1) 1 (2) 3 (3) 4 (4) 2 (5) None of these

Q.71. $\dfrac{(63+36)^2 + (63-36)^2}{63^2 + 36^2} = ?$

(1) 1 (2) 2 (3) 3 (4) 4 (5) None of these

Q.72. $44.60 \times 2.50 = ?$

(1) 11.15 (2) 1.115 (3) 1115 (4) 0.1115 (5) None of these

Q.73. $\dfrac{14 \times 14 - 46}{11 \times 6 - (4)^2} = ?$

(1) 3 (2) 2 (3) 4 (4) 5 (5) None of these

Q.74. $\dfrac{\dfrac{64}{121} - \dfrac{9}{64}}{\dfrac{8}{11} + \dfrac{3}{8}} = ?$

(1) $\dfrac{31}{88}$ (2) $\dfrac{31}{84}$ (3) $\dfrac{61}{88}$ (4) $\dfrac{61}{84}$ (5) None of these

Q.75. $\dfrac{0.1 + 0.75}{2.5 + 0.05} \div \left(0.125 + \dfrac{1}{4.8}\right) = ?$

(1) 5 (2) 4 (3) 3 (4) 2 (5) None of these

CHAPTER-2

NUMBER SERIES

In the number series, some numbers are arranged in a particular sequence. All the numbers form a series and change in a certain order. Sometimes, one or more numbers are wrongly put in the number series. One is required to observe the trend in which the numbers change in the series and find out which number/ numbers misfit into the series. That number/numbers is the ODD NUMBER of the series.

Number Series

Following are some of the important rules or order on which the number series can be made.

1. Pure Series

In this type of number series, the number itself obeys certain order so that the character of the series can be found out.

The number itself may be:

— perfect square

Example :

121, 144, 169, 196, 225, ?

Answer- 256

— perfect cube

Example :

6859, 5832, 4913, 4096, 3375, ?

Answer- 2744

2. Difference Series

Under this category, the **change** in **order** for the differences between each consecutive number of the series is found out.

Example :

1348, 1338, 1318, 1288, 1248, ?

Answer- 1198

3. Ratio Series

Under this category, the change in order for the ratios between each consecutive number of the series is found out.

Example :

336, 168, 84, 42, 21, ?

Answer- 10.5

4. Mixed Series

Here, the numbers obeying various orders of two or more different type of series are arranged alternately in a single number series.

Example :

222, 441, 1321, 2639, 7915, ?

Answer- 15827

5. Geometric Series

Under this category, each successive number is obtained by multiplying (or dividing) the previous number with a fixed number.

Example 1. 5, 35, 245, 1715, ?

Ans. 12005

Example 2. 43923, 3993, 363, 33, ?

Ans. 3

6. Two-tier Arithmetic Series

Under this category, the differences of successive numbers form an arithmetic series.

Example: 4 5 9 16 26 39 55 (74)

+1 +4 +7 +10 +13 +16 +19

+3 +3 +3 +3 +3 +3

Other Type

To find the odd number from the number series. In this type of series the above rules are also followed.

Some examples :

1. 2, 3, 7, 22, 89, 440, 2677, 18740

Solution : ×1+1, ×2+1, ×3+1, ×4+1, ×5+1 .....

So, 440 is replaced by 446

2. 5, 6, 14, 40, 89, 170, 291

Solution : $+1^2$, $+3^2$, $+5^2$, $+7^2$, $+9^2$ .....

So, 14 is replaced by 15.

3. 445, 221, 109, 46, 25, 11,4

Solution : -3÷2, -3÷2.....

So, 46 is replaced by 53.

4. 12, 26, 56, 116, 244, 498, 1008

Solution : ×2+2, ×2+4, ×2+6.....

So, 116 is replaced by 118

5. 8, 27, 64, 125, 217, 343

Solution : 2^3, 3^3, 4^3, 5^3 .....

So, 217 is replaced by 216

EXERCISE

NUMBER SERIES

Q.1-10. What will come in place of question mark (?) in the following number Series ?

Q.1.	7	20	46	98	202	?		
	(1) 420		(2) 410		(3) 310		(4) 320	(5) 340
Q.2.	210	209	213	186	202	?		
	(1)138		(2) 77		(3) 177		(4) 327	(5) 312
Q.3.	27	38	71	126	203	?		
	(1) 212		(2) 202		(3) 301		(4) 312	(5) 302
Q.4.	435	354	282	219	165	?		
	(1) 103		(2) 112		(3) 120		(4) 130	(5) 140
Q.5.	4	200	369	513	634	?		
	(1) 788		(2) 715		(3) 734		(4) 755	(5) 756
Q.6.	13	16	22	33	51	?		
	(1) 89		(2) 78		(3) 102		(4) 69	(5) 68
Q.7.	39	52	78	117	169	?		
	(1) 246		(2) 182		(3) 234		(4) 256	(5) 500
Q.8.	656	432	320	264	236	?		
	(1) 222		(2) 229		(3) 232		(4) 223	(5) 220
Q.9.	62	87	187	412	812	?		
	(1) 1012		(2) 1437		(3) 1337		(4) 1457	(5) 1456
Q.10.	7	8	24	105	361	?		
	(1) 986		(2) 617		(3) 486		(4) 1657	(5) 489

Q.11-20. In the following number series only one is wrong. Find out the wrong number.

Q.11.	32	34	37	46	62	87	123	
	(1) 34		(2) 37		(3) 62		(4) 87	(5) 46
Q.12.	7	18	40	106	183	282	403	
	(1) 18		(2) 282		(3) 40		(4) 106	(5) 7
Q.13.	850	843	829	808	788	745	703	
	(1) 843		(2) 829		(3) 808		(4) 788	(5) 745
Q.14.	33	321	465	537	573	590	600	
	(1) 321		(2) 465		(3) 573		(4) 537	(5) 590
Q.15.	37	47	52	67	87	112	142	
	(1) 47		(2) 52		(3) 67		(4) 87	(5) 112
Q.16.	484	240	120	57	26.5	11.25		
	(1) 240		(2) 120		(3) 57		(4) 26.5	(5) 11.25
Q.17.	3	5	13	43	176	891	5353	
	(1) 5		(2) 13		(3) 43		(4) 176	(5) 891
Q.18.	6	7	16	41	90	154	292	
	(1) 7		(2) 16		(3) 41		(4) 90	(5) 154
Q.19.	5	7	16	57	244	1245	7506	
	(1) 7		(2) 16		(3) 57		(4) 244	(5) 1245
Q.20.	4	2.5	3.5	6.5	15.5	41.25	126.75	
	(1) 2.5		(2) 3.5		(3) 6.5		(4) 15.5	(5) 41.25

Q.21-25. What should come is place of the question mark (?) in the following number Series ?

Q.21.	4	10	40	190	940	?	23440	
	(1) 4690		(2) 2930		(3) 5140		(4) 3680	(5) 3690
Q.22.	2	9	30	?	436	2195	13182	
	(1) 216		(2) 105		(3) 178		(4) 324	(5) 13546
Q.23.	7	4	5	9	?	52.5	160.5	
	(1) 32		(2) 16		(3) 14		(4) 20	(5) 150.2

Q.24.	5	54	90	115	131	140	?	
	(1) 149		(2) 146		(3) 142		(4) 152	(5) 144
Q.25.	6	42	?	1260	5040	15120	30240	
	(1) 546		(2) 424		(3) 252		(4) 328	(5) 30248

Q.26-30. The following number Series only one number is wrong. Find out the wrong number.

Q.26.	850	600	550	500	475	462.5	456.25	
	(1) 600		(2) 550		(3) 500		(4) 462.5	(5) 850
Q.27.	2	10	18	54	162	486	1458	
	(1) 18		(2) 54		(3) 162		(4) 10	(5) 486
Q.28.	13	25	40	57	79	103	130	
	(1) 25		(2) 40		(3) 57		(4) 79	(5) 103
Q.29.	8	12	24	46	72	108	152	
	(1) 12		(2)24		(3) 46		(4) 72	(5) 108
Q.30.	142	119	100	83	65	59	52	
	(1) 65		(2) 100		(3) 69		(4) 119	(5) 59

Q.31-35. What should come is place of the question mark (?) in the following number series ?

Q.31.	9	62	?	1854	7415	22244		
	(1) 433		(2) 309		(3) 406		(4) 371	(5) 7315
Q.32.	4	8	24	60	?	224		
	(1) 178		(2) 96		(3) 109		(4) 141	(5) 124
Q.33.	8000	1600	320	64	12.8	?		
	(1) 2.56		(2) 3.5		(3) 3.2		(4) 2.98	(5) 13.9
Q.34.	6	9	15	27	51	?		
	(1) 84		(2) 99		(3) 123		(4) 75	(5) 58
Q.35.	7	8	18	?	232	1165		
	(1) 84		(2) 42		(3) 57		(4) 36	(5) 248

Q.36-40. In the following number Series only one number is Wrong. Fing out the wrong number.

Q.36.	4	5	12	38	160	805	4836	
	(1) 12		(2) 160		(3) 38		(4) 805	(5) 4836
Q.37.	3	7	16	32	56	93	142	
	(1) 56		(2) 16		(3) 32		(4) 7	(5) 142
Q.38.	11	18	29	42	59	80	101	
	(1) 42		(2) 18		(3) 29		(4) 59	(5) 101
Q.39.	2	9	32	105	436	2195	13182	
	(1) 436		(2) 2195		(3) 9		(4) 32	(5) 2
Q.40.	5	55	495	3465	17325	34650		
	(1) 495		(2) 34650		(3) 55		(4) 17325	(5) 5

Q.41-45. What will come in place of the question mark (?) in each of the following number series ?

Q.41.	17	52	158	477	?	4310		
	(1) 1433		(2) 1432		(3) 1435		(4) 1434	(5) 1436
Q.42.	3	22	?	673	2696	8093		
	(1) 133		(2) 155		(3) 156		(4) 134	(5) 136
Q.43.	6	13	38	?	532	2675		
	(1) 129		(2) 123		(3) 172		(4) 164	(5) 180
Q.44.	286	142	?	34	16	7		
	(1) 66		(2) 72		(3) 64		(4) 70	(5) 75
Q.45.	17	9	?	16.5	35	90		
	(1) 5		(2) 15		(3) 10		(4) 20	(5) 30

Q.46-50. What should come in place of question mark (?) in the following number series ?

Q.46.	0	5	18	43	84	145	?	
	(1) 220		(2) 240		(3) 260		(4) 280	(5) 230
Q.47.	10	17	48	165	688	3475	?	
	(1) 27584		(2) 25670		(3) 21369		(4) 20892	(5) 20841
Q.48.	1	3	24	360	8640	302400	?	
	(1) 14525100		(2) 15415200		(3) 14515200		(4) 15425100	(5) 1542500
Q.49.	12	14	32	102	416	2090	?	
	(1) 15522		(2) 12552		(3) 13525		(4) 17552	(5) 2890
Q.50.	7	16	41	90	171	?		
	(1) 292		(2) 392		(3) 537		(4) 448	(5) 450

CHAPTER-3

PERCENTAGE

Percentage is a fraction whose denominator is always 100. x percentage is represented by x%.

I. To express x% as a fraction : We know

$x\% = \frac{x}{100}$.

Thus $10\% = \frac{10}{100}$ .....(means 10 parts out of 100 parts)

$= \frac{1}{10}$ .....(means 1 part out of 10 parts)

and $20\% = \frac{20}{100} = \frac{1}{5}$

II. To express $\frac{x}{y}$ as a percentage:

We know that $\frac{x}{y} = \left(\frac{x}{y} \times 100\right)\%$

Thus $\frac{1}{4} = \left(\frac{1}{4} \times 100\right)\% = 25\%$

and $0.8 = \frac{8}{10} = \left(\frac{8}{10} \times 100\right)\% = 80\%$

III. If the price of a commodity increases by R%, then reduction in consumption as not to increase the expenditure is-

$$\left[\frac{R}{(100+R)} \times 100\right]\%$$

If the price of a commodity decreases by R%, then the increase in consumption as not to decrease the expenditure is-

$$\left[\frac{R}{(100-R)} \times 100\right]\%$$

IV. **Results on Population :** Let the population of a town be P now and suppose increases at the rate of R% per annum, then :

1. Population after n years $= P\left(1+\frac{R}{100}\right)^n$

2. Population n years ago $= \frac{P}{\left(1+\frac{R}{100}\right)^n}$

V. **Results on Depreciation :** Let the present value of a machine be P. Suppose depreciates at the rate of R% per annum Then :

1. Value of the machine after n years

$= P\left(1-\frac{R}{100}\right)^n$

2. Value of the machine n years ago

$= \frac{P}{\left(1-\frac{R}{100}\right)^n}$

VI. If A is R% more than B, then B is less than A by

$$\left[\frac{R}{(100+R)} \times 100\right]\%$$

If A is R% less than B, then B is more than A by

$$\left[\frac{R}{(100-R)} \times 100\right]\%$$

VII. Net % change $= x + y + \frac{xy}{100}$

Some observation :

I. If 20% candidate failed in an exam then observations are

→ 80% represent passed in exam

→ 100% represent total appeared in exam

→ (80% - 20%) = 60% represent difference between passed and failed candidate in exam.

difference 60% < 20% (Failed), 80% (Passed) > 100% Total

II. If a number is increased by 25% then observations are

→ 100% represent the old number.

→ 125% represent the new number.

i.e., 100% —25%↑— 125%

III. Remember that Base in the given sentence (Question) is always 100%

eg. income of Ram is increased by 20%.

In this sentence →

100% → represent the income of Ram

20% → represent increment.

120% → represent new income of Ram.

Remember it :

1 = 100%

$\frac{1}{2} = 50\%$ $\quad \frac{1}{3} = 33\frac{1}{3}\%$

$\frac{1}{4} = 25\%$ $\quad \frac{1}{5} = 20\%$

$\frac{1}{6} = 16\frac{2}{3}\%$ $\quad \frac{1}{7} = 14\frac{2}{7}\%$

$\frac{1}{8} = 12\frac{1}{2}\%$ $\quad \frac{1}{9} = 11\frac{1}{9}\%$

$\frac{1}{10} = 10\%$ $\quad \frac{1}{11} = 9\frac{1}{11}\%$

$\frac{1}{12} = 8\frac{1}{3}\%$ $\quad \frac{1}{13} = 7\frac{9}{13}\%$

100% < $33\frac{1}{3}\% = \frac{1}{3}$, $66\frac{2}{3}\% = \frac{2}{3}$ > 1

$25\% = \frac{1}{4}$

$6.25\% = \frac{1}{16}$

$125\% = \frac{5}{4}$

$150\% = \frac{3}{2}$

$200\% = 2$

$350\% = \frac{7}{2}$

Ex-1. If the difference between 62% of a number and $\frac{3}{5}$th of that number is 36. What is the number?

Sol. Let the number be x.

Then $x \times 62\% - x \times \frac{3}{5} = 36$

$x \times 62\% - x \times 60\% = 36$ (60% = 3/5)

$x \times 2\% = 36$

$x \times \frac{2}{100} = 36$

$x = \frac{36 \times 100}{2} = 1800$

Ex-2. 40% of Ram's income Rs. 1200 then find

(i) 75% of Ram's income ?

(ii) $\frac{1}{4}$ part of Ram's income ?

(iii) $\frac{1}{3}$ part of Ram's income ?

Sol. (i) 40% = 1200 Rs.

$75\% = \frac{1200}{40} \times 75 = 2250$ Rs.

Trick : $\frac{1200}{40} \times 75$ = Rs. 2250/-

(ii) 40% of income = Rs. 1200

Then $\frac{1}{4}$ part (i.e. 25%) of Ram's

income = $\frac{1200}{40} \times 25$

= Rs. 750/- Ans.

(iii) 40% of Ram's income

= Rs. 1200

i.e. 2/5 part of Ram's income

= Rs. 1200

Then total income of Ram

= Rs. $1200 \times \frac{5}{2}$

$\frac{1}{3}$ part of Ram's income

= Rs. $1200 \times \frac{5}{2} \times \frac{1}{3}$

= Rs 1000 Ans.

Trick : $\frac{1200}{2/5} \times \frac{1}{3}$

$= \frac{1200}{2} \times \frac{5}{3} = 1000$

Ex-3. If the income of Ram is 10% more than that of Shyam's income. How much % Shyam's income is less than that of Ram's income ?

I. Method.

By using formula-

less % = $\frac{r}{100+r} \times 100 = \frac{10}{100+10} \times 100$

$= \frac{10}{110} \times 100 = 9\frac{1}{11}\%$

II. Method.

Since 10% more < 100%, 110% > Two tools

Less % = $10 \times \frac{100}{110}$..... (To decrease any number, we, multiply with small number and divide with large number.)

$= 9\frac{1}{11}\%$

Ex-4. A man spends 40% on food, 20% on house rent, 12% on travel and 10% on education. After all these expenditure he saved Rs. 7200. Find the amount spent on travel ?

Sol. ***Ist Method***

Let the total income be x. Then

Total expenditure

= x × (40% + 20% + 12% + 10%)

= x × 82%

Total saving = x - x × 82%

= x × 18%

Then x × 18% = 7200

$x = \frac{7200}{18} \times 100 = 40{,}000$

Expenditure on travel = 12%

$x \times 12\% = 40000 \times \frac{12}{100}$ = Rs. 4800

IInd Method

Total income = 100% → represent total

Total Exp
- 40% → represent Food
- 20% → represent House Rent
- 12% → Travel
- 10% → Education

100% - 82% = 18% → represent saving

Expenditure on Travel = $\frac{7200}{18} \times 12$

= 4800

Ex-5. When numerator of a fraction is increased by 10% and denominator decreased by 20% then it becomes $\frac{5}{8}$. Find the original fraction ?

Sol. ***Ist Method :***

Let the original fraction be $\frac{x}{y}$ then-

$$\frac{\left(x + \frac{x \times 10}{100}\right)}{\left(y - \frac{y \times 20}{100}\right)} = \frac{5}{8} \Rightarrow \frac{\frac{x \times 110}{100}}{\frac{y \times 80}{100}} = \frac{5}{8}$$

$\frac{x}{y} = \frac{5}{8} \times \frac{80}{110} = \frac{5}{11}$ Ans.

2nd Method

Given fraction → $\frac{5}{8}$

Original fraction = $\frac{5}{8} \times \frac{80}{110}$

$= \frac{5}{11}$ Ans.

Ex-6. Imp. If the length of a rectangle is increased by 20% and breadth is decreased by 10%. Find the net % change in the area of that rectangle .

Sol. We know that

net % change = $x + y + \frac{x \times y}{100}$

Let x = 20% .....(we put x = +20)

& y = 10%..... (we put y = -10)

Now, net % change = $+20 - 10 + \frac{(+20) \times (-10)}{100}$

= +10-2 = +8

Increase % = 8% Ans.

Ex-7. Imp. In an examination Ram got 30% of the maximum marks and failed by 80 marks. Shyam got 200 marks and failed by 15%. What is the maximum marks in the examination ?

Sol. ***Ist Method :***

Let maximum marks be x Then

$x \times \frac{30}{100} + 80 = 200 + \frac{x \times 15}{100}$

$\left(\frac{x \times 30}{100} - \frac{x \times 15}{100}\right) = 200 - 80$

$\frac{x \times 15}{100} = 120 \Rightarrow x = \frac{120 \times 100}{15} = 800$ Ans.

IInd Method :

30% + 80 = 200+15%

15% = 120

$100\% = \frac{120}{15} \times 100$

= 800 Ans.

Ex-8. If the present population of a town is 72600 and it is decreased by 10% per annum. What will be its population 2 years hence ?

Sol. Population after n years = $P\left(1 + \frac{R}{100}\right)^n$

Here P = 72600

R = 10%

n = 2yrs.

Population after 2 years

$= 72600\left(1 - \frac{10}{100}\right)^2$

$= 72600 \times \frac{90}{100} \times \frac{90}{100}$

= 58806

Trick:

Population after 2 yrs

$= 72600 \times \frac{90}{100} \times \frac{90}{100}$

= 58806

Ex-9. A reduction of 10% in the price of tea would enable and purchase to obtain 3 kg. more for 2700 Rs. Find the reduced rate (new rate) of tea.

Sol. 10% of 2700 = Rs. 270

Rs.270 is the rate of 3 kg. of tea.

1 kg of tea = Rs.90 /kg.

EXERCISE

PERCENTAGE

Q.1-5. Find the value of following questions ?

Q.1. 35 is what % of 105 ?

(1) 33% (2) 30% (3) $33\frac{1}{3}$% (4) 33.30% (5) None of these

Q.2. $\frac{7}{8}$ is what % of $\frac{3}{4}$?

(1) $116\frac{1}{3}$% (2) 116% (3) $116\frac{3}{2}$% (4) $116\frac{2}{3}$% (5) None of these

Q.3. What % of 120 is 24 ?

(1) 0.02% (2) 20% (3) 25% (4) 2.5% (5) None of these

Q.4. K is what % of N ?

(1) $\frac{100K}{N}$% (2) $\frac{100N}{K}$% (3) $\frac{100K}{K/N}$% (4) $\frac{K}{100N}$% (5) None of these

Q.5. 25 × 16 is what % of 1600 ?

(1) 20% (2) 25% (3) 26% (4) 30% (5) None of these

Q.6. $33\frac{1}{3}$% of a number is 33. Find the number.

(1) 9 (2) 90 (3) 99 (4) 0.9 (5) None of these

Q.7. 225% of a number is 145. Find the 150% of that number.

(1) 96 (2) 96.66 (3) 96.60 (4) 966 (5) None of these

Q.8. If the sum of 20% & 30% of a number is 324. Find the 75% of that number.

(1) 864 (2) 846 (3) 468 (4) 486 (5) None of these

Q.9. If the product of 15% & 10% of a number is 250. Find the sum of the 15% and 10% of that number.

(1) 41.60 (2) 41.65 (3) 41.66 (4) 42.54 (5) 40.55

Q.10. In a school the ratio between boys and girls is 3 : 4. Find the percentage of boys in the school

(1) 25% (2) 75% (3) 50% (4) 80% (5) None of these

Q.11. Rakesh's salary is increased by 10% & he get now Rs. 5000.Find the salary before the increase

(1) Rs. 4545.45 (2) Rs. 4545 (3) Rs. 4540 (4) Rs. 4544 (5) None of these

Imp

Q.12. Raju spends 40% of his salary on house rent, on remaining 10% spends on travel, on remaining $16\frac{2}{3}$% spends on food and remaining is saved. If he saved Rs. 2250 what amount he spent on food?

(1) Rs. $433\frac{1}{3}$ (2) Rs. 433 (3) Rs. 530 (4) Rs. 550 (5) None of these

Q.13. Rohan's monthly income is Rs.12000. If his monthly income is increased by 10% find the total income after 2 months ?

(1) 14800 (2) 14520 (3) 14502 (4) 14500 (5) None of these

Q.14. When numerator of a fraction is increased by 40% & denominator of a fraction is increased by 60%, resultant fraction becomes $\frac{5}{8}$. Find the original (old) fraction.

(1) $\frac{7}{2}$ (2) $\frac{2}{7}$ (3) $\frac{5}{7}$ (4) $\frac{7}{8}$ (5) None of these

Imp

Q.15. A man spends 60% of his salary. If his salary is increased by 30% then his expanditure also increased by 20%. Find the increase%/ decrease% of his saving.

(1) 45% (2) 50% (3) 60% (4) 75% (5) None of these

Q.16. A student has to score 60% to pass exam. He scores 225 marks & failed by 15%. Find the maximum marks of exam.

(1) 400 (2) 500 (3) 600 (4) Can't be determined (5) None of these

Q.17. A student scores 25% & failed by 30 marks while another student who scores 60% get 40 marks more than minimum required marks to pass. Find the maximum marks in the exam ?

(1) 150 (2) 175 (3) 200 (4) 225 (5) None of these

Q.18. The population of a town increases by 5% annually. If its population in 2011 is 1,38, 915 what it will be in 2012 ?

(1) 1,50000 (2) 1,28,000 (3) 1,40,000 (4) 1,42,000 (5) None of these

Imp

Q.19. Rahul earned 40% more than Sohan. Sohan earned 20% less than Rohan. What% more earn Rahul than Rohan ?

(1) 10% (2) 12% (3) 20% (4) 25% (5) None of these

Q.20. In an election a candidate who gets 84% of the total votes and wins by 476 votes. What is the total number of votes polled ?

(1) 672 (2) 700 (3) 749 (4) 848 (5) None of these

Q.21. The present population of a country estimated to be 10 crores is expected to increase to 13.31 crores during the next three years. The uniform rate of growth is :

(1) 8% (2) 10% (3) 12.7% (4) 15% (5) None of these

Imp

Q.22. The total population of a village is 5000. The number of males and females increases by 10% and 15% respectively and consequently the population of the village becomes 5600. What was the number of males in the village ?

(1) 2000 (2) 2500 (3) 3000 (4) 4000 (5) None of these

Q.23. A's income is 25% more than B's income. B's income in terms of A's income is-

(1) 75% (2) 80% (3) 90% (4) 96% (5) None of these

Q.24. A's income is 50% more than B's. How much percent is B's income less then A's ?

(1) 83% (2) $33\frac{1}{4}$% (3) $33\frac{1}{3}$% (4) $33\frac{1}{2}$% (5) None of these

Q.25. A's height is 40% less than that of B, how much percent B's height is more than that of A ?

(1) $33\frac{1}{3}$% (2) 40% (3) 60% (4) $66\frac{2}{3}$% (5) None of these

Imp

Q.26. Two numbers are less than a third number by 30% and 37% respectively. How much percent as a percentage of the second number less than the first ?

(1) 3% (2) 4% (3) 7% (4) 10% (5) None of these

Q.27. Two numbers are more than a third number by $12\frac{1}{2}$% and 25% respectively . The first number as percentage of the second number is :

(1) 50 % (2) 60% (3) 75% (4) 90% (5) None of these

Q.28. A's salary is 40% of B's salary which is 25% of C's salary. What percentage of C's salary is A's salary ?

(1) 5% (2) 10% (3) 15% (4) 20% (5) None of these

Q.29. 40% of the population of a town are men and 35% are women. If the number of children are 20000, then the number of men will be :

(1) 3200 (2) 80000 (3) 32000 (4) 3,20,000 (5) 2,00,000

Q.30. If the price of sugar is increased by 7%, then by how much percent should a housewife reduce her consumption of sugar, to have no extra expenditure ?

(1) $6\frac{58}{107}$% (2) $1\frac{7}{100}$% (3) 7% (4) $2\frac{58}{107}$% (5) None of these