3 SIMPLIFICATION

Importance : 1 or 2 questions based on simplication are essential part of almost every competitive exams. The difficulty level varies based on examinataion level.

Scope of questions : The mostly asked questions are based on complex, fractions, decimal, squares, cubes, square roots and cuberoots. Questions are completely numerical kind with no alongways.

Way to success: Note that BODMAS rule and other simplification TRICKS & RULES are completely followed. Your concentration and 'Mental calculation' will help most in these questions.

Rule 1 : An expression must be simplified by following defined order/sequence known as VBODMAS, which is given by:

1st step, V – Vineculum (line brackets)/Bar
B – Brackets
O – Of
D – Division
M – Multiplication
A – Addition
Last step, S – Subtraction

There are four types of brackets given below.

(i) – → Line/Bar

(ii) ( ) → Simple or Small Bracket/open brackets

(iii) { } → Curly Brackets/Braces

(iv) [ ] → Square Brackets/Closed brackets

These brackets must be solved in given order only.

Rule 2 :

$$\frac{1}{n(n+1)}+\frac{1}{(n+1)(n+2)}+\frac{1}{(n+2)(n+3)}.....\frac{1}{(n+r-1)(n+r)}$$

$$=\left(\frac{1}{n}-\frac{1}{n+1}\right)+\left(\frac{1}{n+1}-\frac{1}{n+2}\right)+\left(\frac{1}{n+2}-\frac{1}{n+3}\right)$$

$$+ \text{ ..... } + \left(\frac{1}{n+r-1}-\frac{1}{n+r}\right)=\left(\frac{1}{n}-\frac{1}{n+r}\right)$$

Rule 3 : $\frac{1}{n(n+2)}+\frac{1}{(n+2)(n+4)}+\frac{1}{(n+4)(n+6)}$

$$+ \text{ ..... } + \frac{1}{(n+2r-2)(n+2r)} = \frac{1}{2}\left(\frac{1}{n}-\frac{1}{n+2r}\right)$$

Rule 4 : FORMULA → $\frac{a^3+b^3}{a^2-ab+b^2}$ = (a + b)

Rule 5 : FORMULA → $\frac{a^3-b^3}{a^2+ab+b^2}$ = (a – b)

Rule 6 : FORMULA → $\frac{(a+b)^2+(a-b)^2}{(a^2+b^2)}$ = 2

Rule 7 : FORMULA → $a^2 + 2ab + b^2 = (a + b)^2$

Rule 8 : $\frac{a^2-b^2}{a-b}$ = a + b or, $\frac{a^2-b^2}{a+b}$ = a – b

Basic formulae

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

(ii) $(a – b)^2 = a^2 – 2ab + b^2$

(iii) $(a^2 – b^2) = (a + b) (a – b)$

(iv) $(a + b)^2 + (a – b)^2 = 2 (a^2 + b^2)$

(v) $(a + b)^2 – (a – b)^2 = 4ab$

(vi) $(a + b)^3 = a^3 + b^3 + 3ab (a + b)$

(vii) $(a – b)^3 = a^3 – b^3 – 3ab (a – b)$

(viii) $a^3 + b^3 = (a + b) (a^2 – ab + b^2)$

(ix) $a^3 – b^3 = (a – b) (a^2 + ab + b^2)$

(x) $a^3 + b^3 + c^3–3abc = (a + b + c) (a^2 + b^2 + c^2–ab – bc – ca)$

If a + b + c = 0

$\Rightarrow a^3 + b^3 + c^3 = 3abc$

(xi) $a^2+\frac{1}{a^2}=\left(a+\frac{1}{a}\right)^2-2=\left(a-\frac{1}{a}\right)^2+2$

(xii) $\left(a+\frac{1}{a}\right)^3=a^3+\frac{1}{a^3}+3\times\left(a+\frac{1}{a}\right)$

(xiii) $\left(a-\frac{1}{a}\right)^3=a^3-\frac{1}{a^3}-3\times\left(a-\frac{1}{a}\right)$

SQUARE ROOTS AND CUBE ROOTS

Importance : Questions based on square roots and cube roots are mainly asked with the questions of simplication and number system.

Scope of questions : Questions may be basic (totally numeric) or applied.

Way to success : Learning Formulae and squares/ square roots/cube/cube roots of different numbers is very useful.

Some important Points (On Square Roots):

If a number n is multiplied with itself, then product n^2 is called the Square of n and here n is called the Square root of n^2.

If a number has x digits, then its square has (2x – 1) digits.

Number is 12 square is 144

$\therefore$ Number of digit in144 is $2 \times 2 - 1 = 3$

If we square any number, then 2, 3, 7 and 8 will never come at unit place of square.

The square root of a negative number is always imaginary.

Square of a two–digit number whose unit place digit is 5 can be obtained as.

$(25)^2 = 2 \times 3$ (Hundred) $+ 5^2 = 2 \times 300 + 25 = 625$

or,

$(35)^2 = 3 \times 4$ (Hundred) $+ 5^2 = 3 \times 400 + 25 = 1225$

There are two methods of calculating square root.

(i) Factor method (ii) Division method

(i) **Factor method :** Square root of 44100

$\therefore$ $44100 = 2\times2\times3\times3\times5\times5\times7\times7$

$\therefore$ $\sqrt{44100} = \sqrt{2^2\times3^2\times5^2\times7^2}$

$= 2\times3\times5\times7 = 210$

(ii) **Division method :** Square root of 455625

$$\begin{array}{r|l} 6 & \overline{45}\ \overline{56}\ \overline{25}\ (675 \\ 6 & 36 \\ \hline 127 & 0956 \\ 7 & -889 \\ \hline 1345 & 6725 \\ 5 & -6725 \\ \hline & 0 \end{array}$$

$= \sqrt{455625} = 675.$

Special Rules :

(i) $(ab)^{\frac{1}{2}} = \sqrt{ab} = \sqrt{a} \times \sqrt{b} = (a)^{\frac{1}{2}} \times (b)^{\frac{1}{2}}$

(ii) $\left(\frac{a}{b}\right)^{\frac{1}{2}} = \frac{(a)^{\frac{1}{2}}}{(b)^{\frac{1}{2}}} = \frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$

If the unit digit of a number is 1, then unit digit of its square root is 1 or 9 such as

$\sqrt{81} = 9$ or, $\sqrt{441} = 21$

If the unit digit of any number is 4, then the unit digit of its square root is 2 or 8. Such as, $\sqrt{64} = 8$ or, $\sqrt{144} = 12$

If the unit digit of any number is 5 or 00 (double zero) then the unit digit of its square root is 5 or 0.

As, $\sqrt{625} = 25$, $\sqrt{100} = 10$

Square roots of some numbers :

$\sqrt{0} = 0$	$\sqrt{1} = 1$
$\sqrt{2} = 1.414$	$\sqrt{3} = 1.732$
$\sqrt{4} = 2$	$\sqrt{25} = 5$
$\sqrt{9} = 3$	$\sqrt{49} = 7$
$\sqrt{16} = 4$	$\sqrt{81} = 9$
$\sqrt{36} = 6$	$\sqrt{121} = 11$
$\sqrt{64} = 8$	$\sqrt{169} = 13$
$\sqrt{100} = 10$	$\sqrt{225} = 15$
$\sqrt{144} = 12$	$\sqrt{289} = 17$
$\sqrt{196} = 14$	$\sqrt{361} = 19$
$\sqrt{256} = 16$	$\sqrt{441} = 21$
$\sqrt{324} = 18$	
$\sqrt{400} = 20$	

Some Important Points (On Cube Roots) :

If a number n is multiplied by itself 3 times then n^3 is called the cube of n and here n is called the cube root of n^3.

Cube roots can be calculated only by factor method.

If in any number 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9 are at unit place, then 0, 1, 8, 7, 4, 5, 6, 3,2 or 9 respectively will be the unit place of their cube root.

Note that if unit place of any number is 0, 1, 4, 5, 6 or 9 then unit place of the cube or cube root of this number will be same as in original number.

To calculate cubic root of 3375.

$3375 = 3 \times 3 \times 3 \times 5 \times 5 \times 5$

$\therefore$ $\sqrt[3]{3375} = \sqrt[3]{3^3\times5^3} = 3 \times 5 = 15$

If $\sqrt[3]{x} = b$ then $x^{\frac{1}{3}} = b \Rightarrow \log x^{\frac{1}{3}} = \log b$

$\Rightarrow \frac{1}{3} \log x = \log b$

$\therefore$ $b = \text{antilog}\left(\frac{1}{3}\log x\right)$.

Some Cube Roots :

$\sqrt[3]{1} = 1$	$\sqrt[3]{8} = 2$
$\sqrt[3]{27} = 3$	$\sqrt[3]{64} = 4$
$\sqrt[3]{125} = 5$	$\sqrt[3]{216} = 6$
$\sqrt[3]{343} = 7$	$\sqrt[3]{512} = 8$
$\sqrt[3]{729} = 9$	$\sqrt[3]{1000} = 10$
$\sqrt[3]{1331} = 11$	$\sqrt[3]{1728} = 12$
$\sqrt[3]{2197} = 13$	$\sqrt[3]{2744} = 14$
$\sqrt[3]{3375} = 15$	$\sqrt[3]{4096} = 16$
$\sqrt[3]{4913} = 17$	$\sqrt[3]{5832} = 18$
$\sqrt[3]{6859} = 19$	$= 20$

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QUESTIONS ASKED IN PREVIOUS SSC EXAMS

TYPE–I

1. Simplify : $1+\cfrac{1}{1+\cfrac{2}{2+\cfrac{3}{1+\cfrac{4}{5}}}}$

(1) $1\frac{11}{17}$ (2) $1\frac{5}{7}$

(3) $1\frac{6}{17}$ (4) $1\frac{21}{17}$

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. Simplify : $1+\cfrac{2}{1+\cfrac{3}{1+\cfrac{4}{5}}}$

(1) $\frac{7}{4}$ (2) $\frac{4}{7}$

(3) $\frac{7}{5}$ (4) $\frac{3}{7}$

(SSC CGLPrelim Exam. 04.07.1999 (First Sitting)

3. The value of

$\cfrac{1}{3+\cfrac{1}{2-\cfrac{1}{\frac{7}{9}}}}+\frac{17}{22}$ is :

(1) $\frac{12}{22}$ (2) $\frac{22}{5}$

(3) $\frac{5}{22}$ (4) 1

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

4. If $x = 1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{2}}}}$

then, the value of $2x+\frac{7}{4}$ is :

(1) 3 (2) 4

(3) 5 (4) 6

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

5. Simplify :

$\frac{19}{43}\div\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\frac{1}{4}}}}$

(1) 1 (2) $\frac{19}{43}$

(3) $\frac{43}{19}$ (4) $\frac{38}{43}$

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

6. The simplification of $\cfrac{5}{3+\cfrac{3}{1-\frac{2}{3}}}$

gives

(1) 5 (2) $\frac{5}{3}$

(3) $\frac{5}{12}$ (4) $\frac{3}{5}$

(SSC CPO S.I. Exam. 2.01.2003)

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

(1) $\frac{18}{17}$ (2) $\frac{21}{17}$

(3) $\frac{13}{17}$ (4) $\frac{12}{17}$

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

8. Find the value of

$\cfrac{2}{1+\cfrac{1}{1-\frac{1}{2}}}\times\frac{3}{\frac{5}{6}\text{ of }\frac{3}{2}\div 1\frac{1}{4}}$

(1) 6 (2) 8

(3) 4 (4) 2

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

9. Simplify :

$1+\cfrac{4}{2+\cfrac{3}{5-\frac{1}{2}}}-\frac{1}{2}(10\div 2)$

(1) 1 (2) 0

(3) $-\frac{15}{2}$ (4) $-\frac{1}{2}$

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

10.

$\left[\left(1+\cfrac{1}{10+\frac{1}{10}}\right)\times\left(1+\cfrac{1}{10+\frac{1}{10}}\right)-\left(1-\cfrac{1}{10+\frac{1}{10}}\right)\times\left(1-\cfrac{1}{10+\frac{1}{10}}\right)\right]\div$

$\left[\left(1+\cfrac{1}{10+\frac{1}{10}}\right)+\left(1-\cfrac{1}{10+\frac{1}{10}}\right)\right]$

simplifies to

(1) $\frac{100}{101}$ (2) $\frac{90}{101}$

(3) $\frac{20}{101}$ (4) $\frac{101}{100}$

(SSC CPO S.I. Exam. 07.09.2003)

11. $\cfrac{5\frac{9}{14}}{5+\cfrac{3}{3+\cfrac{1}{\frac{3}{5}}}}$ is equal to

(1) 1 (2) 1.5

(3) 2 (4) 2.5

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

12. $\cfrac{2}{2+\cfrac{2}{3+\cfrac{2}{3+\frac{2}{3}}}\times 0.39}$ is simplified to

(1) $\frac{1}{3}$ (2) 2

(3) 6 (4) None of these

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

13. $1+\frac{1}{1+\frac{1}{2}}$ is equal to

(1) 3 (2) $\frac{3}{2}$

(3) $\frac{2}{3}$ (4) $\frac{5}{3}$

(SSC CPO S.I. Exam. 05.09.2004)

14. $\frac{13}{48}$ is equal to

(1) $\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{16}}}$

(2) $\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{8}}}$

(3) $\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8}}}}$

(4) $\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4}}}}$

(SSC CPO S.I. Exam. 03.09.2006)

15. The value of

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{2}{3}}}}$$ is

(1) $\frac{21}{13}$ (2) $\frac{17}{3}$

(3) $\frac{34}{21}$ (4) $\frac{8}{5}$

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

16. The value of $\cfrac{2\frac{1}{3}-1\frac{2}{11}}{3+\cfrac{1}{3+\cfrac{1}{3+\frac{1}{3}}}}$ is

(1) $\frac{38}{109}$ (2) $\frac{109}{38}$

(3) 1 (4) $\frac{116}{109}$

(SSC CGL Tier-1 Exam 26.06.2011 (First Sitting)

17. The value of $3+\cfrac{3}{3+\cfrac{1}{3+\frac{1}{3}}}$ is

(1) $\frac{40}{11}$ (2) $\frac{43}{11}$

(3) $\frac{46}{11}$ (4) $\frac{41}{11}$

(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

18. $1+\cfrac{1}{1+\frac{1}{5}}=?$

(1) $\frac{11}{6}$ (2) $\frac{13}{6}$

(3) $\frac{15}{6}$

(4) None of the above

(SSC CISF Constable (GD) Exam. 05.06.2011)

19.

$$\frac{4\frac{2}{7}-\frac{1}{2}}{3\frac{1}{2}+1\frac{1}{7}}\div\frac{1}{2+\cfrac{1}{2+\cfrac{1}{5-\frac{1}{5}}}}$$

is equal to

(1) 1 (2) $\frac{1}{2}$

(3) 2 (4) $\frac{1}{3}$

(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

20. If $\left[4-\cfrac{5}{1+\cfrac{1}{3+\cfrac{1}{2+\frac{1}{4}}}}\right]^{th}$ part of a journey takes 10 minutes, then to complete $\frac{3}{5}$th of that journey, it will take

(1) 40 minutes (2) 45 minutes

(3) 48 minutes (4) 36 minutes

(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

21. $\sqrt{\cfrac{4\frac{1}{7}-2\frac{1}{4}}{3\frac{1}{2}+1\frac{1}{7}}\div\cfrac{2}{2+\cfrac{1}{2+\cfrac{1}{5-\frac{1}{5}}}}}$

is equal to

(1) 1 (2) 4

(3) 3 (4) 2

(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

22. The value of $1+\cfrac{1}{1+\cfrac{2}{3+\frac{4}{5}}}$ is :

(1) $\frac{12}{29}$ (2) $\frac{8}{19}$

(3) $\frac{48}{29}$ (4) $\frac{2}{19}$

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

23. The value of $1-\cfrac{a}{1-\cfrac{1}{1+\frac{a}{1-a}}}$ is

(1) a (2) $1-a$

(3) 1 (4) 0

(SSC CGL Tier-I Exam. 26.10.2014)

24. On simplification, the expression

$$\frac{4\frac{1}{7}-2\frac{1}{7}}{3\frac{1}{2}+1\frac{1}{7}}\div\frac{1}{2+\cfrac{1}{2+\cfrac{1}{5-\frac{1}{5}}}}$$

is equal to

(1) $\frac{28}{65}$ (2) $\frac{24}{53}$

(3) $\frac{56}{53}$ (4) $\frac{14}{65}$

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

25. The simplified value of :

$$\left\{\left(1+\frac{1}{10+\frac{1}{10}}\right)\left(1+\frac{1}{10+\frac{1}{10}}\right)-\left(1-\frac{1}{10+\frac{1}{10}}\right)\left(1-\frac{1}{10+\frac{1}{10}}\right)\right\}\div\left\{\left(1+\frac{1}{10+\frac{1}{10}}\right)\left(1-\frac{1}{10+\frac{1}{10}}\right)\right\}$$

(1) $\frac{20}{101}$ (2) $\frac{100}{101}$

(3) 2 (4) $\frac{90}{101}$

(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

26. The value of

$$4-\frac{1}{1+\frac{1}{3+\frac{1}{2+\frac{1}{4}}}}$$ is

(1) $\frac{1}{8}$ (2) $\frac{1}{64}$

(3) $\frac{1}{16}$ (4) $\frac{1}{32}$

(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

TYPE–II

1. Evaluate : $\frac{9|3-5|-5|4|\div 10}{-3(5)-2\times 4\div 2}$

(1) $\frac{9}{10}$ (2) $-\frac{8}{17}$

(3) $-\frac{16}{19}$ (4) $\frac{4}{7}$

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. 5–[4–{3–(3–3–6)}] is equal to :

(1) 10 (2) 6

(3) 4 (4) 0

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

3. Evaluate :

$$\frac{-(4-6)^2-3(-2)+|-6|}{18-9\div 3\times 5}$$

(1) $\frac{3}{8}$ (2) $\frac{4}{7}$

(3) $\frac{8}{3}$ (4) $\frac{7}{4}$

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

4. Simplify : $\frac{\frac{5}{3}\times\frac{7}{51}\text{ of }\frac{17}{5}-\frac{1}{3}}{\frac{2}{9}\times\frac{5}{7}\text{ of }\frac{28}{5}-\frac{2}{3}}$

(1) $\frac{1}{2}$ (2) 4

(3) 2 (4) $\frac{1}{4}$

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

5. 1– [5 – {2 + (– 5 + 6 – 2) 2}] is equal to :

(1) –4 (2) 2

(3) 0 (4) –2

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

6. On simplification 3034 – (1002 ÷ 20.04) is equal to

(1) 3029 (2) 2984

(3) 2993 (4) 2543

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

7. When simplified, the expression

$(100)^{\frac{1}{2}}\times(0.001)^{\frac{1}{3}}-(0.0016)^{\frac{1}{4}}\times 3^0+\left(\frac{5}{4}\right)^{-1}$ is equal to:

(1) 1.6 (2) 0.8

(3) 1.0 (4) 0

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

8. When $\left(\frac{1}{2}-\frac{1}{4}+\frac{1}{5}-\frac{1}{6}\right)$ is divided by $\left(\frac{2}{5}-\frac{5}{9}+\frac{3}{5}-\frac{7}{18}\right)$, the result is :

(1) $5\frac{1}{10}$ (2) $2\frac{1}{18}$

(3) $3\frac{1}{6}$ (4) $3\frac{3}{10}$

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

9. Simplify :

$$8\frac{1}{2}-\left[3\frac{1}{4}\div\left\{1\frac{1}{4}-\frac{1}{2}\left(1\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)\right\}\right]$$

(1) $4\frac{1}{2}$ (2) $4\frac{1}{6}$

(3) $9\frac{1}{2}$ (4) $\frac{2}{9}$

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

10. If $\frac{50}{*}=\frac{*}{12\frac{1}{2}}$, then the value of * is :

(1) $\frac{25}{2}$ (2) $\frac{4}{25}$

(3) 4 (4) 25

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

11. The value of 0.008 × 0.01 × 0.072 ÷ (0.12 × 0.0004) is :

(1) 1.2 (2) 0.12

(3) 0.012 (4) 1.02

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

12. The value of

$$\frac{2}{3}\times\frac{3}{\frac{5}{6}\div\frac{2}{3}\text{ of }1\frac{1}{4}}$$ is :

(1) 2 (2) 1

(3) $\frac{1}{2}$ (4) $\frac{2}{3}$

(SSC CGL Prelim Exam. 24.02.2002 (Ist Sitting) & (SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting)

13. Find the sum of the following :

$$\frac{1}{9}+\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+\frac{1}{30}+\frac{1}{42}+\frac{1}{56}+\frac{1}{72}$$

(1) $\frac{1}{2}$ (2) 0

(3) $\frac{1}{9}$ (4) $\frac{1}{2520}$

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

14. The value of 25 – 5 [2 + 3 (2 – 2 (5 – 3) + 5) – 10] ÷ 4 is :

(1) 5 (2) 23.25

(3) 23.75 (4) 25

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

15. Find the value of * in the following

$$1\frac{2}{3} \div \frac{2}{7} \times \frac{*}{7} = 1\frac{1}{4} \times \frac{2}{3} \div \frac{1}{6}$$

(1) $\frac{1}{6}$ (2) 0.6

(3) 0.006 (4) 6

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

16. $9 - 1\frac{2}{9}$ of $3\frac{3}{11} \div 5\frac{1}{7}$ of $\frac{7}{9}$ is equal to :

(1) 8 (2) 9

(3) $8\frac{32}{81}$ (4) $\frac{3}{4}$

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

17. The value of

$$\frac{5}{1\frac{7}{8} \text{ of } 1\frac{1}{3}} \times \frac{2\frac{1}{10}}{3\frac{1}{2}} \text{ of } 1\frac{1}{4}$$

(1) $1\frac{1}{2}$ (2) 0.05

(3) 1 (4) 2

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

18. $\frac{9}{20} - \left[\frac{1}{5} + \left\{\frac{1}{4} + \left(\frac{5}{6} - \overline{\frac{1}{3} + \frac{1}{2}}\right)\right\}\right]$

is equal to

(1) 0 (2) 1

(3) $\frac{9}{20}$ (4) $\frac{9}{10}$

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

19. $\frac{0.8\overline{3} \div 7.5}{2.3\overline{21} - 0.0\overline{98}}$ is equal to

(1) 0.6 (2) 0.1

(3) 0.06 (4) 0.05

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

20. For what value of *, statement $\left[\frac{(*)}{21} \times \frac{(*)}{189}\right] = 1$ is correct ?

(1) 3969 (2) 147

(3) 63 (4) 21

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

21. If $\frac{1120}{\sqrt{P}} = 80$, then P is equal to

(1) 14 (2) 140

(3) 196 (4) 225

(SSC CPO S.I. Exam. 12.01.2003

22. $\frac{3\frac{1}{4} - \frac{4}{5} \text{ of } \frac{5}{6}}{4\frac{1}{3} \div \frac{1}{5} - \left(\frac{3}{10} + 21\frac{1}{5}\right)} - \left(1\frac{2}{3} \text{ of } 1\frac{1}{2}\right)$

is equal to

(1) 9 (2) $11\frac{1}{2}$

(3) 13 (4) $15\frac{1}{2}$

(SSC CPO S.I. Exam. 12.01.2003

23. Simplify

$$\left[3\frac{1}{4} \div \left\{1\frac{1}{4} - \frac{1}{2}\left(2\frac{1}{2} - \overline{\frac{1}{4} - \frac{1}{6}}\right)\right\}\right] \div \left(\frac{1}{2} \text{ of } 4\frac{1}{3}\right)$$

(1) 18 (2) 36

(3) 39 (4) 78

(SSC CPO S.I. Exam. 12.01.2003

24. The value of

$$\frac{0.1 \times 0.1 \times 0.1 + 0.2 \times 0.2 \times 0.2 + 0.3 \times 0.3 \times 0.3 - 3 \times 0.1 \times 0.2 \times 0.3}{0.1 \times 0.1 + 0.2 \times 0.2 + 0.3 \times 0.3 - 0.1 \times 0.2 - 0.2 \times 0.3 - 0.3 \times 0.1}$$

is

(1) 0.006 (2) 0.6

(3) 0 (4) 0.2

(SSC CPO S.I. Exam. 12.01.2003

25.

$$\frac{1}{30} + \frac{1}{42} + \frac{1}{56} + \frac{1}{72} + \frac{1}{90} + \frac{1}{110} = ?$$

(1) $\sqrt{2}\frac{2}{27}$ (2) $\frac{1}{9}$

(3) $\frac{5}{27}$ (4) $\frac{6}{55}$

(SSC CPO S.I. Exam. 12.01.2003

26. If $I = \frac{3}{4} \div \frac{5}{6}$, II = 3 ÷ [(4 ÷ 5) ÷ 6], III = [3 ÷ (4 ÷ 5)] ÷ 6, IV = 3 ÷ 4 (5 ÷ 6) then

(1) I and II are equal

(2) I and IV are equal

(3) I and III are equal

(4) All are equal

(SSC CPO S.I. Exam. 12.01.2003

27. The value of 1 ÷ [1 + 1 ÷ {1 + 1 ÷ (1 + 1 ÷ 2)}] is

(1) 1 (2) $\frac{5}{8}$

(3) 2 (4) $\frac{1}{2}$

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

28. The simplified value of

$$\frac{\frac{1}{3} \div \frac{1}{3} \times \frac{1}{3}}{\frac{1}{3} \div \frac{1}{3} \text{ of } \frac{1}{3}} - \frac{1}{9} \text{ is}$$

(1) 0 (2) 1

(3) $\frac{1}{3}$ (4) $\frac{1}{9}$

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

29. Simplify :

$$\frac{2\frac{3}{4}}{1\frac{5}{6}} \div \frac{7}{8} \times \left(\frac{1}{3} + \frac{1}{4}\right) + \frac{5}{7} \div \frac{3}{4} \text{ of } \frac{3}{7}$$

(1) $\frac{56}{77}$ (2) $\frac{49}{80}$

(3) $\frac{2}{3}$ (4) $3\frac{2}{9}$

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

30. The simplification of

$3.\overline{36} - 2.\overline{05} + 1.\overline{33}$ equals :

(1) 2.60 (2) $2.\overline{61}$

(3) 2.64 (4) $2.\overline{64}$

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

31. The value of

$$\frac{0.9 \times 0.9 \times 0.9 + 0.2 \times 0.2 \times 0.2 + 0.3 \times 0.3 \times 0.3 - 3 \times 0.9 \times 0.2 \times 0.3}{0.9 \times 0.9 + 0.2 \times 0.2 + 0.3 \times 0.3 - 0.9 \times 0.2 - 0.2 \times 0.3 - 0.3 \times 0.9}$$

is

(1) 1.4 (2) 0.054

(3) 0.8 (4) 1.0

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

32. Simplify :

$\left(0.\overline{1}\right)^2\left\{1-9\left(0.1\overline{6}\right)^2\right\}$

(1) $-\frac{1}{162}$ (2) $\frac{1}{108}$

(3) $\frac{7696}{10^6}$ (4) $\frac{1}{109}$

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

33. Simplify :

$\frac{1+\frac{1}{2}}{1-\frac{1}{2}} \div \frac{4}{7}\left(\frac{2}{5}+\frac{3}{10}\right)$ of $\frac{\frac{1}{2}+\frac{1}{3}}{\frac{1}{2}-\frac{1}{3}}$

(1) $\frac{2}{3}$ (2) $37\frac{1}{2}$

(3) $\frac{3}{2}$ (4) $18\frac{3}{8}$

(SSC CGL Prelim Exam. 11.05.2003) (Second Sitting)

34. Simplify :

$[0.9 - \{2.3 - 3.2 - (7.1 - 5.4 - 3.5)\}]$

(1) 0.18 (2) 1.8

(3) 0 (4) 2.6

(SSC CGL Prelim Exam. 11.05.2003) (Second Sitting)

35. $(32)^3 + (79)^3 - (111)^3 + 3 \times 32 \times 79 \times 111$ is equal to

(1) 10000 (2) 0

(3) 30007 (4) 1

(SSC CPO S.I. Exam. 07.09.2003)

36. $\left(\frac{5}{2}+\frac{3}{2}\right)\left(\frac{25}{4}-\frac{15}{4}+\frac{9}{4}\right)$ is equal to

(1) 38 (2) 19

(3) 37 (4) 36

(SSC CPO S.I. Exam. 07.09.2003)

37. $(0.2 \times 0.2 + 0.01)\ (0.1 \times 0.1 + 0.02)^{-1}$ is equal to

(1) $\frac{5}{3}$ (2) $\frac{41}{12}$

(3) $\frac{41}{4}$ (4) $\frac{9}{5}$

(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

38. $\frac{1}{2}+\left\{4\frac{3}{4}-\left(3\frac{1}{6}-2\frac{1}{3}\right)\right\}$ is equal to

(1) $3\frac{2}{3}$ (2) $1\frac{1}{4}$

(3) $4\frac{5}{12}$ (4) $1\frac{2}{3}$

(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

39. The simplification of $\frac{1}{8}+\frac{1}{8^2}+\frac{1}{8^3}+\frac{1}{8^4}+\frac{1}{8^5}$ upto three-places of decimals yields

(1) 0.143 (2) 0.163

(3) 0.215 (4) 0.715

(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

40. $8.7-\left[7.6-\left\{6.5-\left(5.4-\overline{4.3-2}\right)\right\}\right]$ is simplified to :

(1) 2.5 (2) 3.5

(3) 4.5 (4) 5.5

(SSC CGL Prelim Exam. 08.02.2004) (Second Sitting)

41. The simplified value of $[(0.111)^3 + (0.222)^3 - (0.333)^3 + (0.333)^2\ (0.222)]^3$ is :

(1) 0.999 (2) 0

(3) 0.888 (4) 0.111

(SSC CGL Prelim Exam. 08.02.2004) (Second Sitting)

42. $\frac{1\frac{1}{4} \div 1\frac{1}{2}}{\left(\frac{1}{15}+1-\frac{9}{10}\right)}$ is equal to :

(1) 3 (2) 6

(3) $\frac{2}{5}$ (4) 5

(SSC CGL Prelim Exam. 08.02.2004) (Second Sitting)

43. $\frac{-\frac{1}{2}-\frac{2}{3}+\frac{4}{5}-\frac{1}{3}+\frac{1}{5}+\frac{3}{4}}{\frac{1}{2}+\frac{2}{3}-\frac{4}{3}+\frac{1}{3}-\frac{1}{5}-\frac{4}{5}}$ is simplified to

(1) $-\frac{10}{3}$ (2) $-\frac{3}{10}$

(3) 1 (4) – 2

(SSC CGL Prelim Exam. 08.02.2004) (Second Sitting)

44. The simplification of $\left(0.\overline{63}+0.\overline{37}+0.\overline{80}\right)$ yields the result

(1) $1.\overline{80}$ (2) $1.\overline{81}$

(3) $1.\overline{79}$ (4) 1.80

(SSC CGL Prelim Exam. 08.02.2004) (Second Sitting)

45. $\frac{(4.53-3.07)^2}{(3.07-2.15)\,(2.15-4.53)} + \frac{(3.07-2.15)^2}{(2.15-4.53)\ (4.53-3.07)} + \frac{(2.15-4.53)^2}{(4.53-3.07)\ (3.07-2.15)}$ is simplified to

(1) 0 (2) 1

(3) 2 (4) 3

(SSC CPO S.I. Exam. 05.09.2004)

46. $\frac{17}{15}\times\frac{17}{15}+\frac{2}{15}\times\frac{2}{15}-\frac{17}{15}\times\frac{4}{15}$ is equal to

(1) 0 (2) 1

(3) 10 (4) 11

(SSC CPO S.I. Exam. 05.09.2004)

47. $\left(4\frac{11}{15}+\frac{15}{71}\right)^2 - \left(4\frac{11}{15}-\frac{15}{71}\right)^2$ is equal to :

(1) 1 (2) 2

(3) 3 (4) 4

(SSC CPO S.I. Exam. 26.05.2005)

48. The value of $\frac{0.1\times0.1\times0.1+0.02\times0.02\times0.02}{0.2\times0.2\times0.2+0.04\times0.04\times0.04}$ is :

(1) 0.0125 (2) 0.125

(3) 0.25 (4) 0.5

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

49. If * represents a number, then the value of * in $5\frac{3}{*}\times3\frac{1}{2}=19$ is :

(1) 7 (2) 4

(3) 6 (4) 2

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

50. $\left(\sqrt{2}+\frac{1}{\sqrt{2}}\right)^2$ is equal to :

(1) $2\frac{1}{2}$ (2) $3\frac{1}{2}$

(3) $4\frac{1}{2}$ (4) $5\frac{1}{2}$

(SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting) & (SSC CISF ASI Exam. 29.08.2010)

51. The value of $(0.98)^3 + (0.02)^3 + 3 \times 0.98 \times 0.02 - 1$ is :
(1) 1.98 (2) 1.09
(3) 1 (4) 0
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

52. $(71 \times 29 + 27 \times 15 + 8 \times 4)$ equals
(1) 3450 (2) 3458
(3) 2496 (4) None of these
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

53. $(0 . 05 \times 5 - 0 . 005 \times 5)$ equals
(1) 2.250 (2) 0.225
(3) 0.0225 (4) 0.275
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

54. The value of

$$\sqrt[3]{\frac{0.2 \times 0.2 \times 0.2 + 0.04 \times 0.04 \times 0.04}{0.4 \times 0.4 \times 0.4 + 0.08 \times 0.08 \times 0.08}}$$

is
(1) 0.5 (2) 0.25
(3) 0.75 (4) 0.125
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

55. $(256)^{0.16} \times (16)^{0.18}$ is equal to
(1) 4 (2) 16
(3) 64 (4) 256.25
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

56.

$$\left(\frac{1}{3.5} + \frac{1}{5.7} + \frac{1}{7.9} + \frac{1}{9.11} + \frac{1}{11.13} + \frac{1}{13.15}\right)$$

is equal to
(1) $\frac{2}{45}$ (2) $\frac{4}{45}$
(3) $\frac{7}{45}$ (4) $\frac{2}{15}$
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

57. $(53 \times 87 + 159 \times 21 + 106 \times 25)$ is equal to
(1) 16000 (2) 1060
(3) 10600 (4) 60100
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

58. The value of $\frac{0.125 + 0.027}{0.25 - 0.15 + 0.09}$ is
(1) 0.2 (2) 0.25
(3) 0.3 (4) 0.8
(SSC CGL Prelim Exam. 27.07.2008 (IInd Sitting) & (SSC CGL Tier-I Exam. 16.05.2010 (Ist Sitting)

59. $\frac{8(3.75)^3 + 1}{(7.5)^2 - 6.5}$ is equal to
(1) 2.75 (2) $\frac{9}{5}$
(3) 4.75 (4) 8.5
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

60. The value of

$$\frac{(2.697 - 0.498)^2 + (2.697 + 0.498)^2}{2.697 \times 2.697 + 0.498 \times 0.498}$$ is
(1) 4 (2) 2
(3) 2.199 (4) 3.195
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

61. The least fraction to be subtracted from the expression

$$\frac{3\frac{1}{4} - \frac{4}{5} \text{ of } \frac{5}{6}}{4\frac{1}{3} \div \frac{1}{5} - \left(\frac{3}{10} + 21\frac{1}{5}\right)}$$ to make it an integer.
(1) $\frac{1}{2}$ (2) $\frac{5}{6}$
(3) $\frac{1}{4}$ (4) $\frac{3}{10}$
(SSC CPO S.I. Exam. 06.09.2009)

62. If $\sqrt[2]{0.014 \times 0.14x} = 0.014 \times 0.14\sqrt[2]{y}$, find the value of $\frac{x}{y}$.
(1) 0.000196 (2) 0.00196
(3) 0.0196 (4) 0.196
(SSC CPO S.I. Exam. 06.09.2009)

63. $\frac{4.41 \times 0.16}{2.1 \times 1.6 \times 0.21}$ is simplified to
(1) 1 (2) 0.1
(3) 0.01 (4) 10
(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

64. $(0.1 \times 0.01 \times 0.001 \times 10^7)$ is equal to
(1) 100 (2) $\frac{1}{10}$
(3) $\frac{1}{100}$ (4) 10
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

65. $\frac{3.25 \times 3.20 - 3.20 \times 3.05}{0.064}$ is equal to :
(1) 1 (2) $\frac{1}{2}$
(3) $\frac{1}{10}$ (4) 10
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

66. $\left\{\frac{(0.1)^2 - (0.01)^2}{0.0001} + 1\right\}$ is equal to
(1) 1010 (2) 110
(3) 101 (4) 100
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

67. $(0.5 \times 5 + 0.25 \times 0.5 + 0.5 \times 4 + 0.5 \times 0.75)$ is equal to
(1) 5 (2) 10
(3) 15 (4) 20
(SSC CISF ASI Exam. 29.08.2010 (Paper-1)

68. $\frac{(5 + 5 + 5 + 5) \div 5}{3 + 3 + 3 + 3 \div 3}$ is equal to
(1) 1 (2) $\frac{3}{10}$
(3) $\frac{4}{9}$ (4) $\frac{2}{5}$
(SSC (South Zone) Investigator Exam. 12.09.2010)

69.

$$\frac{(100-1)(100-2)(100-3)\ldots(100-200)}{100 \times 99 \times 98 \times \ldots \times 3 \times 2 \times 1}$$

is equal to
(1) $\frac{100}{99 \times 98 \times 97 \times \ldots \times 3 \times 2 \times 1}$
(2) $-\frac{1}{99 \times 98 \times 97 \times \ldots \times 3 \times 2 \times 1}$
(3) 0
(4) $-\frac{2}{99 \times 98 \times 97 \times \ldots \times 3 \times 2 \times 1}$
(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

70. $(0.9 \times 0.9 \times 0.9 + 0.1 \times 0.1 \times 0.1)$ is equal to
(1) 0.73 (2) 0.82
(3) 0.91 (4) 1.00
(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

71. Simplify:

$$\frac{0.0347\times0.0347\times0.0347+(0.9653)^3}{(0.0347)^2-(0.347)(0.09653)+(0.9653)^2}$$

(1) 0.9306 (2) 1.0009
(3) 1.0050 (4) 1

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

72. The value of $\frac{(3.2)^3-0.008}{(3.2)^2+0.64+0.04}$ is

(1) 0 (2) 2.994
(3) 3.208 (4) 3

(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

73. Simplify:

$$\frac{\frac{1}{3}+\frac{1}{4}\left[\frac{2}{5}-\frac{1}{2}\right]}{1\frac{2}{3}\text{ of }\frac{3}{4}-\frac{3}{4}\text{ of }\frac{4}{5}}$$

(1) $\frac{37}{78}$ (2) $\frac{37}{13}$

(3) $\frac{74}{78}$ (4) $\frac{74}{13}$

(SSC Multi-Tasking (Non-Technical) Staff Exam. 20.02.2011)

74. $\frac{0.04}{0.03}$ of $\frac{\left(3\frac{1}{3}-2\frac{1}{2}\right)\div\frac{1}{2}\text{ of }1\frac{1}{4}}{\frac{1}{3}+\frac{1}{5}\text{ of }\frac{1}{9}}$

(1) 1 (2) 5

(3) $\frac{1}{5}$ (4) $\frac{1}{2}$

(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011)

75. $\frac{0.3555\times0.5555\times2.025}{0.225\times1.7775\times0.2222}$ is equal to :

(1) 5.4 (2) 4.58
(3) 4.5 (4) 5.45

(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

76. 100 ×10 –100 + 2000 ÷ 100= ?

(1) 29 (2) 920
(3) 980 (4) 1000

(SSC Graduate Level Tier-I Exam. 11.11.2012 (Ist Sitting)

77. If $\frac{547.527}{0.0082}=x$, then the value of $\frac{547527}{82}$ is

(1) $10x$ (2) $100x$

(3) $\frac{x}{100}$ (4) $\frac{x}{10}$

(SSC CHSL DEO & LDC Exam. 04.11.2012 Ist Sitting)

78. $\frac{1}{1+2^{a-b}}+\frac{1}{1+2^{b-a}}$ is

(1) $a-b$ (2) $b-a$
(3) 1 (4) 0

(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

79. The value of

$$3\frac{1}{2}-\left[2\frac{1}{4}\div\left\{1\frac{1}{4}-\frac{1}{2}\left(1\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)\right\}\right]$$

is

(1) $\frac{1}{2}$ (2) $2\frac{1}{2}$

(3) $3\frac{1}{2}$ (4) $9\frac{1}{2}$

(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

80. $3\frac{3}{5}\times3\frac{3}{5}+2\times3\frac{3}{5}\times\frac{2}{5}+\frac{2}{5}\times\frac{2}{5}=?$

(1)15 (2) 16
(3) 17 (4) 18

(SSC Constable (GD) Exam. 12.05.2013)

81. Find the sum of

$$\left(1-\frac{1}{n+1}\right)+\left(1-\frac{2}{n+1}\right)+\left(1-\frac{3}{n+1}\right)+.....\left(1-\frac{n}{n+1}\right)$$

(1) n (2) $\frac{1}{2}n$

(3) $(n+1)$ (4) $\frac{1}{2}(n+1)$

(SSC Graduate Level Tier-II Exam. 29.09.2013

82. The value of

$$5\frac{1}{3}\div1\frac{2}{9}\times\frac{1}{4}\left(10+\frac{3}{1-\frac{1}{5}}\right)\text{ is}$$

(1) 15 (2) $\frac{67}{25}$

(3) $\frac{128}{11}$ (4) $\frac{128}{99}$

(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

83. If x [–2 {–4 (–a)}] +5 [–2 {–2 (–a)}] = 4a, then x =

(1) –2 (2) –3
(3) –4 (4) –5

(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

84. The value of

$$3\div\left[(8-5)\div\left\{(4-2)+\left(2+\frac{8}{13}\right)\right\}\right]\text{ is}$$

(1) $\frac{15}{17}$ (2) $\frac{13}{17}$

(3) $\frac{15}{19}$ (4) $\frac{13}{19}$

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

85. If '+' means '÷', '×', means '–', '÷' means '×' and '–' means '+', what will be the value of the following expression ?

9 + 3 ÷ 4 – 8 × 2 = ?

(1) $6\frac{1}{4}$ (2) $6\frac{3}{4}$

(3) $-1\frac{3}{4}$ (4) 18

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

86. The simplified value of

$\frac{4}{15}$ of $\frac{5}{8}$ × 6 + 15 – 10 is

(1) 6 (2) 3
(3) 5 (4) 4

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 IInd Sitting)

87. The value of the following is :

$$\frac{0.2 \times 0.02 \times 0.002 \times 32}{0.4 \times 0.04 \times 0.004 \times 16}$$

(1) 0.20 (2) 0.50
(3) 0.40 (4) 0.25

(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

88. $(113^2 + 115^2 + 117^2 - 113 \times 115 - 115 \times 117 - 117 \times 113)$ is equal to

(1) 0 (2) 4
(3) 8 (4) 12

(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (IInd Sitting)

TYPE–III

1. Assume that

$\sqrt{13} = 3.605$ (approximately)

$\sqrt{130} = 11.40$ (approximately)

Find the value of :

$$\sqrt{1.3} + \sqrt{1300} + \sqrt{0.013}$$

(1) 36.164 (2) 36.304
(3) 37.304 (4) 37.164

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. On simplification of

$$\frac{(2.644)^2 - (2.356)^2}{0.288}$$

we get :

(1) 1 (2) 4
(3) 5 (4) 6

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

3. Simplification of

$$\frac{(3.4567)^2 - (3.4533)^2}{0.0034}$$

yields the result :

(1) 6.91 (2) 7
(3) 6.81 (4) 7.1

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

4. The value of $\frac{(0.03)^2 - (0.01)^2}{0.03 - 0.01}$ is:

(1) 0.02 (2) 0.004
(3) 0.4 (4) 0.04

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

5. $\left(\sqrt{72} - \sqrt{18}\right) \div \sqrt{12}$ is equal to:

(1) $\sqrt{6}$ (2) $\sqrt{3}/2$
(3) $\sqrt{2}/3$ (4) $\sqrt{6}/2$

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

6. The value of $\frac{\sqrt{80} - \sqrt{112}}{\sqrt{45} - \sqrt{63}}$ is :

(1) $\frac{3}{4}$ (2) $1\frac{3}{4}$
(3) $1\frac{1}{3}$ (4) $1\frac{7}{9}$

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

7. The value of

$$\sqrt{\frac{(0.1)^2 + (0.01)^2 + (0.009)^2}{(0.01)^2 + (0.001)^2 + (0.0009)^2}}$$

is :

(1) 10^2 (2) 10
(3) 0.1 (4) 0.01

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

8. The value of

$$\sqrt{\frac{(0.03)^2 + (0.21)^2 + (0.065)^2}{(0.003)^2 + (0.021)^2 + (0.0065)^2}}$$

is :

(1) 0.1 (2) 10
(3) 10^2 (4) 10^3

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

9. The sum of

$\sqrt{0.01} + \sqrt{0.81} + \sqrt{1.21} + \sqrt{0.0009}$ is :

(1) 2.1 (2) 2.13
(3) 2.03 (4) 2.11

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

10. The value of

$$\sqrt{\frac{(6.1)^2 + (61.1)^2 + (611.1)^2}{(0.61)^2 + (6.11)^2 + (61.11)^2}}$$ is

(1) 0.1 (2) 1.1
(3) 10 (4) 100

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

11. Simplify

$$\sqrt{\left[(12.1)^2 - (8.1)^2\right] \div \left[(0.25)^2 + (0.25)(19.95)\right]}$$

(1) 1 (2) 2
(3) 3 (4) 4

(SSC CPO S.I. Exam. 12.01.2003

12. The value of

$$\frac{0.051 \times 0.051 \times 0.051 + 0.041 \times 0.041 \times 0.041}{0.051 \times 0.051 - 0.051 \times 0.041 + 0.041 \times 0.041}$$

is :

(1) 0.92 (2) 0.092
(3) 0.0092 (4) 0.00092

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

13. The value of

$$\sqrt{5 + \sqrt{11 + \sqrt{19 + \sqrt{29 + \sqrt{49}}}}}$$ is

(1) 3 (2) 9
(3) 7 (4) 5

(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

14. The value of $\frac{(75.8)^2 - (55.8)^2}{20}$ is

(1) 20 (2) 40
(3) 121.6 (4) 131.6

(SSC CPO S.I. Exam. 07.09.2003)

15. $\sqrt{\frac{0.25}{0.0009}} \times \sqrt{\frac{0.09}{0.36}}$ is equal to :

(1) $\frac{5}{6}$ (2) $7\frac{1}{6}$
(3) $7\frac{1}{3}$ (4) $8\frac{1}{3}$

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

16. $\frac{(3.63)^2 - (2.37)^2}{3.63 + 2.37}$ is simplified to

(1) 6 (2) 1.36
(3) 2.26 (4) 1.26

(SSC CPO S.I. Exam. 03.09.2006)

17. $\sqrt{\frac{0.081 \times 0.484}{0.0064 \times 6.25}}$ is equal to

(1) 9 (2) 0.9
(3) 99 (4) 0.99

(SSC CPO S.I. Exam. 09.11.2008)

18. The simplified value of

$\sqrt{900} + \sqrt{0.09} - \sqrt{0.000009}$ is

(1) 30.27 (2) 30.297
(3) 30.097 (4) 30.197

(SSC CPO S.I. Exam. 06.09.2009)

19. $\sqrt{\frac{0.009 \times 0.036 \times 0.016 \times 0.08}{0.002 \times 0.0008 \times 0.0002}}$ is equal to

(1) 34 (2) 36
(3) 38 (4) 39

(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

20. $\sqrt{1\frac{1}{4} \times \frac{64}{125} \times 1.44}$ is equal to

(1) $1\frac{1}{25}$ (2) $\frac{24}{25}$
(3) $\frac{23}{25}$ (4) $\frac{21}{25}$

(SSC CISF ASI Exam. 29.08.2010 (Paper-1)

21. $\left[2\sqrt{54} - 6\sqrt{\frac{2}{3}} - \sqrt{96}\right]$ is equal to

(1) 0 (2) 1
(3) 2 (4) $\sqrt{6}$

(SSC CISF ASI Exam. 29.08.2010 (Paper-1)

22. $\frac{\sqrt{24} + \sqrt{216}}{\sqrt{96}}$ is equal to

(1) $\frac{2}{\sqrt{6}}$ (2) $2\sqrt{6}$
(3) $4\sqrt{6}$ (4) 2

(SSC CPO Sub-Inspector Exam. 12.12.2010 (Paper-I)

23. The value of $\frac{4 - \sqrt{0.04}}{4 + \sqrt{0.4}}$ is close to

(1) 0.4 (2) 0.8
(3) 1.0 (4) 1.4

(SSC CPO S.I. Exam. 12.01.2003)

24. The value of

$\left(3+\sqrt{8}\right)+\frac{1}{3-\sqrt{8}}-\left(6+4\sqrt{2}\right)$ is

(1) 8 (2) 1
(3) $\sqrt{2}$ (4) 0

(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

25. What is the square root of 0.09?

(1) 0.3 (2) 0.03
(3) 0.003 (4) 3.0

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

26. The square root of :

$\frac{(0.75)^3}{1-0.75} + \left[0.75 + (0.75)^2 + 1\right]$

is :

(1) 4 (2) 3
(3) 2 (4) 1

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting

27. The square root of $(272^2 - 128^2)$ is :

(1) 256 (2) 200
(3) 240 (4) 144

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

28. The value of $\sqrt{0.000441}$ is equal to :

(1) 0.21 (2) 0.0021
(3) 0.021 (4) 0.00021

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

29. The value of $\frac{\sqrt{0.441}}{\sqrt{0.625}}$ is equal to :

(1) 0.048 (2) 0.84
(3) 0.48 (4) 0.084

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

30. The square root of

$\frac{0.342 \times 0.684}{0.000342 \times 0.000171}$ is :

(1) 250 (2) 2500
(3) 2000 (4) 4000

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

31. $\sqrt{0.00060516}$ is equal to

(1) 0.0246 (2) 0.00246
(3) 0.246 (4) 0.000246

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

32. The Square root of

$\frac{9.5 \times 0.085}{0.017 \times 0.019}$ is

(1) 0.5 (2) 5
(3) 50 (4) 500

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & SSC MTS Exam. 17.03.2013 (IInd Sitting)

33. Find the value of

$\sqrt{248 + \sqrt{52 + \sqrt{144}}}$

(1) –16 (2) ± 16
(3) 16 (4) 16.2

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & SSC CGL Exam. 08.02.2004 (IInd Sitting)

34. If $(102)^2 = 10404$ then,the value of

$\sqrt{104.04} + \sqrt{1.0404} + \sqrt{0.010404}$

is equal to

(1) 0.306 (2) 0.0306
(3) 11.122 (4) 11.322

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

35. $\sqrt{0.00004761}$ equals

(1) 0.069 (2) 0.0069
(3) 0.00069 (4) 0.0609

(SSC CPO S.I. Exam. 12.01.2003

36. If $\sqrt{2} = 1.414$, the square root of $\frac{\sqrt{2}-1}{\sqrt{2}+1}$ is nearest to

(1) 0.172 (2) 0.414
(3) 0.586 (4) 1.414

(SSC CPO S.I. Exam. 12.01.2003

37. $\sqrt{\frac{0.00001225}{0.00005392}}$ is equal to :

(1) $\frac{25}{77}$ (2) $\frac{35}{73}$
(3) $\frac{35}{77}$ (4) $\frac{25}{73}$

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

38. The square root of $0.\overline{4}$ is :

(1) $0.\overline{8}$ (2) $0.\overline{6}$
(3) $0.\overline{7}$ (4) $0.\overline{9}$

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

39. The square root of

$\frac{\left(3\frac{1}{4}\right)^4 - \left(4\frac{1}{3}\right)^4}{\left(3\frac{1}{4}\right)^2 - \left(4\frac{1}{3}\right)^2}$ is :

(1) $7\frac{1}{12}$ (2) $5\frac{5}{12}$
(3) $1\frac{1}{12}$ (4) $1\frac{7}{12}$

(SSC CPO S.I. Exam. 26.05.2005)

40. The positive square root of [0.6 × 0.6 × 0.6 + 0.4 × 0.4 × 0.4 + 3 × 0.6 × 0.4] is equal to

(1) 2.1736 (2) 1
(3) 0.21736 (4) 0.072

(SSC SAS Exam. 26.06.2010 (Paper-1)

41. $\sqrt{\frac{0.49}{0.25}} + \sqrt{\frac{0.81}{0.36}}$ is equal to :

(1) $7\frac{9}{10}$ (2) $2\frac{9}{10}$

(3) $\frac{9}{10}$ (4) $9\frac{9}{10}$

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

42. If $\sqrt{x} \div \sqrt{441} = 0.02$, then value of x is :

(1) 1.64 (2) 2.64

(3) 1.764 (4) 0.1764

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

43. Find the value of

$\sqrt{4 + \sqrt{44 + \sqrt{10000}}}$

(1) 12 (2) 8

(3) 4 (4) –4

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

44. Given that

$\sqrt{574.6} = 23.97$

$\sqrt{5746} = 75.8$

then $\sqrt{0.00005746}$ equals

(1) 0.002397 (2) 0.0002397

(3) 0.007580 (4) 0.00758

(SSC CPO S.I. Exam. 12.01.2003

45.

$\sqrt{(0.798)^2 + 0.404 \times 0.798 + (0.202)^2}$ +1 = 2 ?

(1) 0 (2) 2

(3) 1.596 (4) 0.404

(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

46. The value of

$\sqrt{11.981 + 7\sqrt{1.2996}}$ is closest to

(1) 5.1 (2) 4.9

(3) 4.5 (4) 4.1

(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

47. The value of

$\sqrt{32} - \sqrt{128} + \sqrt{50}$ correct to 3 places of decimal is :

(1) 1.732 (2) 1.141

(3) 1.414 (4) 1.441

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

48. The square root of

$(7 + 3\sqrt{5})(7 - 3\sqrt{5})$ is :

(1) 4 (2) $\sqrt{5}$

(3) $3\sqrt{5}$ (4) 2

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

49. The value of

$\sqrt{400} + \sqrt{0.0400} + \sqrt{0.000004}$ is

(1) 0.222 (2) 20.22

(3) 20.202 (4) 2.022

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

50. If $\sqrt{3}$ = 1.7321, the value of $\sqrt{192} - \frac{1}{2}\sqrt{48} - \sqrt{75}$, correct to 3 places of decimal, is

(1) 8.661 (2) 4.331

(3) 1.7321 (4) –1.732

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

51. $\sqrt{\frac{48.4}{0.289}}$ is equal to

(1) $129\frac{7}{17}$ (2) $1\frac{5}{17}$

(3) $12\frac{16}{17}$ (4) $12\frac{1}{17}$

(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

52. The sum of the squares of 3 consecutive positive numbers is 365. The sum of the numbers is

(1) 30 (2) 33

(3) 36 (4) 45

(SSC Multi-Tasking (Non-Technical) Staff Exam. 20.02.2011)

53. If $\sqrt{4096}$ = 64, then the value of

$\sqrt{40.96} + \sqrt{0.4096}$ $+\sqrt{0.004096}$ $+\sqrt{0.00004096}$ up to two places of decimals is :

(1) 7.09 (2) 7.10

(3) 7.11 (4) 7.12

(SSC CGL Prelim Exam. 24.02.2002 (Ist Sitting) & SSC CGL Prelim Exam. 13.11.2005 (Ist Sitting) & FCI Assistant Grade III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

54. Given that $\sqrt{13}$ = 3.6 and $\sqrt{130} = 11.4$, then the value of $\sqrt{1.3} + \sqrt{1300} + \sqrt{0.013}$ is equal to

(1) 36.164 (2) 37.254

(3) 36.254 (4) 37.154

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

55. The simplified value of

$\sqrt{5 + \sqrt{11 + \sqrt{19 + \sqrt{29 + \sqrt{49}}}}}$ is

(1) 3 (2) 2

(3) 4 (4) 6

(SSC CPO S.I. Exam. 06.09.2009)

56. $\sqrt{110\frac{1}{4}}$ is equal to

(1) 12.0 (2) 11.5

(3) 11.0 (4) 10.5

(SSC CPO Sub-Inspector Exam 12.12.2010 (Paper-I)

57. $\sqrt{8 + \sqrt{57 + \sqrt{38 + \sqrt{108 + \sqrt{169}}}}}$ =?

(1) 4 (2) 6

(3) 8 (4) 10

(SSC CGL Tier-1 Exam 19.06.2011 (First Sitting)

58. If $(10.15)^2$ = 103.0225, then the value of $\sqrt{1.030225}$ + $\sqrt{10302.25}$ is

(1) 1025·15 (2) 103·515

(3) 102·515 (4) 102·0515

(SSC CPO (SI, ASI & Intelligence Officer) Exam 28.08.2011 (Paper-I)

59. The number of digits in the square root of 625686734489 is

(1) 4 (2) 5

(3) 6 (4) 7

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

60. If the square root of 841 is 29, then 0.00000841 is equal to :

(1) 0.029 (2) 0.0029

(3) 0.00029 (4) 0.29

(SSC CGL Prelim Exam. 04.07.1999 (First Sitting) & Tier-1 Exam, 16.05.2010 (First Sitting)

61. The square root of

$\frac{0.324 \times 0.081 \times 4.624}{1.5625 \times 0.0289 \times 72.9 \times 64}$ is

(1) 24 (2) 2.4

(3) 0.024 (4) 1.2

(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (Ist Sitting)

62. The simplified value of

$\sqrt{0.25 \times 2.25}$ is

(1) 0.075 (2) 0.705

(3) 0.750 (4) 7.500

(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (IInd Sitting)

63. $\sqrt{64} - \sqrt{36}$ is equal to

(1) –2 (2) 2

(3) 0 (4) 1

(SSC CISF Constable (GD) Exam.

64. If $\sqrt{18225} = 135$, then the value of

$\sqrt{18225} + \sqrt{182.25} + \sqrt{1.8225} + \sqrt{0.018225}$ is

(1) 14.9985 (2) 149.985

(3) 1499.85 (4) 1.49985

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

65. The square root of $21\frac{51}{169}$ is

(1) $5\frac{8}{13}$ (2) $4\frac{8}{13}$

(3) $4\frac{3}{13}$ (4) $5\frac{5}{13}$

(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

66. If $(1101)^2 = 1212201$, find the value of $\sqrt{121.2201}$.

(1) 110.1 (2) 11.01

(3) 1.101 (4) 11.001

(SSC CGL Tier-I Exam. 11.11.2012 (Ist Sitting)

67. The value of

$\sqrt{\frac{0.064 \times 0.256 \times 15.625}{0.025 \times 0.625 \times 4.096}}$ is

(1) 2 (2) 2.4

(3) 0.24 (4) 4.2

(SSC Delhi Police Sub-Inspector (SI) Exam. 19.08.2012)

68. The value of

$\sqrt{19.36} + \sqrt{0.1936} + \sqrt{0.001936} + \sqrt{0.00001936}$ is :

(1) 4.8484 (2) 4.8694

(3) 4.8884 (4) 4.8234

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

69. The number of pairs of natural numbers, the difference of whose squares is 45 will be

(1) 2 (2) 3

(3) 6 (4) 5

(SSC CHSL DEO & LDC Exam. 04.11.2012, IInd Sitting)

70. What is the value of $\frac{\sqrt{24} + \sqrt{216}}{\sqrt{96}}$?

(1) $2\sqrt{6}$ (2) $4\sqrt{6}$

(3) 2 (4) 4

(SSC Multi-Tasking Staff Exam. 10.03.2013)

71. Simplify :

$\sqrt{3\frac{33}{64}} \div \sqrt{9\frac{1}{7}} \times 2\sqrt{3\frac{1}{9}}$

(1) $\frac{45}{256}$ (2) $1\frac{17}{28}$

(3) $4\frac{3}{8}$ (4) $2\frac{3}{16}$

(SSC Multi-Tasking Staff Exam. 17.03.2013, Ist Sitting)

72. The simplified value of $\frac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}}$ is

(1) 3 (2) 2

(3) 6 (4) 4

(SSC Multi-Tasking Staff Exam. 17.03.2013, IInd Sitting)

73. Number of digits in the square root of 62478078 is:

(1) 4 (2) 5

(3) 6 (4) 3

(SSC CGL Tier-I Exam. 21.04.2013, Ist Sitting)

74. If $\left(n^r - t\,n + \frac{1}{4}\right)$ be a perfect square, then the values of t are:

(1) ± 2 (2) 1, 2

(3) 2,3 (4) ± 1

(SSC CGL Tier-I Exam. 21.04.2013, Ist Sitting)

75. The square root of $33 - 4\sqrt{35}$ is :

(1) $\pm\left(2\sqrt{7} + \sqrt{5}\right)$

(2) $\pm\left(\sqrt{7} + 2\sqrt{5}\right)$

(3) $\pm\left(\sqrt{7} - 2\sqrt{5}\right)$

(4) $\pm\left(2\sqrt{7} - \sqrt{5}\right)$

(SSC CGL Tier-I Exam. 21.04.2013)

76. Find the value of

$\sqrt{156.25} + \sqrt{0.0081} - \sqrt{0.0361}$

(1) 13.4 (2) 15.4

(3) 12.4 (4) 17.4

(SSC Constable (GD) Exam. 12.05.2013)

77. The fourth root of 24010000 is

(1) 7 (2) 49

(3) 490 (4) 70

(SSC CGL Tier-I Exam. 19.05.2013)

78. The digit at the unit's place in the square-root of 15876 is :

(1) 8 (2) 6

(3) 4 (4) 2

(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

79. The digit at unit's place of the number $(1570)^2 + (1571)^2 + (1572)^2 + (1573)^2$ is :

(1) 4 (2) 1

(3) 2 (4) 3

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

80. The smallest 4-digit number, which is a perfect square, is

(1) 1009 (2) 1016

(3) 1024 (4) 1025

(SSC CPO Sub-Inspector Exam. 05.09.2004 & SAS Exam. 26.06.2010)

81. The smallest number added to 680621 to make the sum a perfect square is :

(1) 4 (2) 5

(3) 6 (4) 8

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

82. The smallest positive integer, when multiplied by 392, the product is a perfect square, is

(1) 6 (2) 5

(3) 3 (4) 2

(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

83. Which smallest number must be added to 2203 so that we get a perfect square ?

(1) 1 (2) 3

(3) 6 (4) 8

(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

84. The number of perfect square numbers between 50 and 1000 is

(1) 21 (2) 22

(3) 23 (4) 24

(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

85. The smallest number which should be added to the number 8958 so that the result is a perfect square is
(1) 69 (2) 67
(3) 77 (4) 79
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

86. The largest number of five digits, which is a perfect square is
(1) 99999 (2) 99976
(3) 99856 (4) 99764
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

87. How many perfect squares lie between 120 and 300 ?
(1) 5 (2) 6
(3) 7 (4) 8
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

88. The smallest number that must be subtracted from 1000 to make the resulting number a perfect square is
(1) 37 (2) 38
(3) 39 (4) 40
(SSC Data Entry Operator Exam. 02.08.2009)

89. The least integer which should be added to 1000 so as to make it a perfect square is
(1) 10 (2) 18
(3) 24 (4) 89
(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (Ist Sitting)

90. The greatest 4 digit number which is a perfect square, is
(1) 9999 (2) 9909
(3) 9801 (4) 9081
(SSC CGL Tier-I Exam. 19.05.2013)

91. What number must be added to the expression $16a^2 - 12a$ to make it a perfect square ?
(1) $\frac{9}{4}$ (2) $\frac{11}{2}$
(3) $\frac{13}{2}$ (4) 16
(SSC CGL Tier-I Exam. 19.05.2013)

92. If the number p is 5 more than q and the sum of the squares of p and q is 55, then the product of p and q is
(1) 10 (2) –10
(3) 15 (4) –15
(SSC Multi-Tasking (Non-Technical) Staff Exam. 20.02.2011)

93. The square root of a positive number less than 100 lies between :
(1) 0 and 1000
(2) 0 and 10
(3) –10 and 10
(4) –100 and 100
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

94. If the sum of two numbers is 22 and the sum of their squares is 404, then the product of the numbers is :
(1) 40 (2) 44
(3) 80 (4) 88
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

95. One-third of the square root of which number is 0.001?
(1) 0.0009 (2) 0.000001
(3) 0.00009 (4) None of the above
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

96. Three fifth of the square of a certain number is 126.15. What is the number?
(1) 210.25 (2) 75.69
(3) 14.5 (4) 145
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting) & SSC CGL Prelim Exam. 13.11.2005)

97. How many positive integers less than 1000 are multiples of 11 whose square roots are whole numbers.
(1) 2 (2) 4
(3) 8 (4) 11
(SSC CPO S.I. Exam. 07.09.2003)

98. The number, whose square is equal to the difference of the squares of 75.15 and 60.12, is
(1) 46.09 (2) 48.09
(3) 45.09 (4) 47.09
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

99. The sum of the squares of two numbers is 386. If one of the number is 5, the other will be :
(1) 18 (2) 19
(3) 15 (4) 20
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

100. The number, whose square is equal to the difference between the squares of 975 and 585, is :
(1) 780 (2) 390
(3) 1560 (4) 130
(SSC CPO S.I. Exam. 26.05.2005)

101. If the sum and difference of two numbers are 20 and 8 respectively, then the difference of their squares is :
(1) 12 (2) 28
(3) 80 (4) 160
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

102. The sum of the squares of two positive integers is 100 and the difference of their squares is 28. The sum of the numbers is :
(1) 12 (2) 13
(3) 14 (4) 15
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

103. If x is a perfect square integer such that $7 < (2x - 3) < 17$, then the value of x is :
(1) 25 (2) 16
(3) 9 (4) 4
(SSC CHSL DEO & LDC Exam. 27.11.2010)

104. If the product of four consecutive natural numbers increased by a natural number p, is a perfect square; then the value of p is
(1) 8 (2) 4
(3) 2 (4) 1
(SSC CPO S.I. Exam. 03.09.2006)

105. Given that $\sqrt{24}$ is approximately equal to 4.898. $\sqrt{\frac{8}{3}}$ is nearly equal to
(1) 0.544 (2) 1.333
(3) 1.633 (4) 2.666
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

106. There are some boys and girls in a room. The square of the number of the girls is less than the square of the number of boys by 28. If there were two more girls, the number of boys would have been the same as that of the girls. The total number of the boys and girls in the room are
(1) 56 (2) 14
(3) 10 (4) 7
(SSC CPO S.I. Exam. 16.12.2007)

107. If the sum of the squares of three consecutive natural numbers is 110, then the smallest of these natural numbers is :
(1) 8 (2) 6
(3) 7 (4) 5
(SSC CPO S.I. Exam. 16.12.2007)

108. The product of two whole numbers is 37. The square root of the difference of the numbers is
(1) 8 (2) 7.5
(3) 6 (4) 4.5
(SSC CPO S.I. Exam. 16.12.2007)

109. The number, whose square is equal to the difference of the squares of the numbers 68 and 32, is
(1) 36 (2) 48
(3) 60 (4) 64
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

110. The sum of a positive integer and its square is 2450. The positive integer is
(1) 45 (2) 48
(3) 49 (4) 50
(SSC (South Zone) Investigator Exam 12.09.2010)

111. The product of two numbers is 45 and their difference is 4. The sum of squares of the two numbers is
(1) 135 (2) 240
(3) 73 (4) 106
(SSC CGL Tier-1 Exam 19.06.2011 (First Sitting)

112. 1008 divided by which single digit number gives a perfect square?
(1) 9 (2) 4
(3) 8 (4) 7
(SSC CGL Exam. 27.02.2000 (Ist Sitting)

113. The least number that must be subtracted from 63520 to make the result a perfect square is :
(1) 16 (2) 20
(3) 24 (4) 30
(SSC CGL Exam. 24.02.2002 (IInd Sitting)

114. What is the least number which should be subtracted from 0.000326, to have perfect square ?
(1) 0.000004 (2) 0.000002
(3) 0.04 (4) 0.02
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

115. By which smallest number should 5808 be multiplied so that it becomes a perfect square?
(1) 2 (2) 7
(3) 11 (4) 3
(SSC CGL Exam. 04.07.1999 (Ist Sitting)

116. By which smallest number should 20184 be multiplied so that it becomes a perfect square ?
(1) 2 (2) 3
(3) 5 (4) 6
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

117. The least number which must be added to 1728 to make it a perfect square is _____.
(1) 36 (2) 32
(3) 38 (4) 30
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014

118. If a = 64 and b = 289, then the value of

$$\left(\sqrt{\sqrt{a}+\sqrt{b}}-\sqrt{\sqrt{b}-\sqrt{a}}\right)^{\frac{1}{2}} \text{ is}$$

(1) $2^{1/2}$ (2) 2
(3) 4 (4) –2
(SSC CGL Tier-II Exam. 21.09.2014

119. $\sqrt{64009}$ is equal to
(1) 352 (2) 523
(3) 253 (4) 532
(SSC CGL Tier-II Exam. 21.09.2014

120. A tourist spends daily as many rupees as the number of days of his total tour. If his total expenses were ₹ 361, then how many days did his tour last ?
(1) 17 days (2) 19 days
(3) 21 days (4) 31 days

121. The value of $\sqrt{10^{-6}\times 0.25}$ is
(1) 0.0025 (2) 0.0005
(3) 0.25 (4) 0.50
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014

122. The simplified value of

$$\frac{3\sqrt{2}}{\sqrt{3}+\sqrt{6}}-\frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}}+\frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}} \text{ is}$$

(1) $\sqrt{2}$ (2) $\frac{1}{\sqrt{2}}$
(3) $\sqrt{3}-\sqrt{2}$ (4) 0
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

123. The value of $\frac{4-\sqrt{0.04}}{4+\sqrt{0.4}}$ is close to
(1) 0.4 (2) 0.8
(3) 1.0 (4) 1.4
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

124. If $\sqrt{0.05\times 0.5\times a} = 0.5\times 0.05\times\sqrt{b}$, then $\frac{a}{b}$ is equal to
(1) 0.0025 (2) 0.025
(3) 0.25 (4) 0.00025
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

125. A teacher wants to arrange his students in an equal number of rows and columns. If there are 1369 students, the number of students in the last row are
(1) 37 (2) 33
(3) 63 (4) 47
(SSC CHSL DEO & LDC Exam. 9.11.2014)

126. Which of the following is true?
(1) $\sqrt{5}+\sqrt{3} > \sqrt{6}+\sqrt{2}$
(2) $\sqrt{5}+\sqrt{3} < \sqrt{6}+\sqrt{2}$
(3) $\sqrt{5}+\sqrt{3} = \sqrt{6}+\sqrt{2}$
(4) $(\sqrt{5}+\sqrt{3})(\sqrt{6}+\sqrt{2}) = 1$
(SSC CHSL DEO & LDC Exam. 9.11.2014)

127. The least number by which 20184 must be multiplied so as to make the product a perfect square is
(1) 2 (2) 3
(3) 5 (4) 6
(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

128. 1008 divided by which single digit number gives a perfect square ?
(1) 9 (2) 4
(3) 8 (4) 7
(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

129. The sum of two numbers is 37 and the difference of their squares is 185. then the difference between the two numbers is :
(1) 10 (2) 4
(3) 5 (4) 3
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

130. A General of Army wants to form a square from 36562 armies. After arrangement, he found some armies left. How many armies were left ?
(1) 81 (2) 36
(3) 97 (4) 65
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

131. The square root of $\frac{2+\sqrt{3}}{2}$ is
(1) $\pm\frac{1}{\sqrt{2}}(\sqrt{3}+1)$
(2) $\pm\frac{1}{2}(\sqrt{3}-2)$
(3) None of these
(4) $\pm\frac{1}{2}(\sqrt{3}-1)$
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

132. The value of $(11111)^2$ is
(1) 12344321 (2) 121212121
(3) 123454321 (4) 11344311
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

133. The smallest whole number that is to be multiplied with 59535 to make a perfect square number is x. The sum of digits of x is
(1) 9 (2) 5
(3) 7 (4) 6
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

134. The digit in the unit place in the square root of 66049 is
(1) 3 (2) 7
(3) 8 (4) 2
(SSC CGL Tier-I Re-Exam, 30.08.2015)

135. The value of $\sqrt{0.000441}$ is equal to
(1) 0.21 (2) 0.00021
(3) 0.0021 (4) 0.021
(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

136. The sum of the perfect squares between 120 and 300 is
(1) 1400 (2) 1296
(3) 1024 (4) 1204
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 01.11.2015, IInd Sitting)

137. The least number that should be subtracted from the number 32146 to make it a perfect square is :
(1) 305 (2) 105
(3) 205 (4) 405
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

138. If 5416 * 6 is a perfect square, then the digit at '*' is :
(1) 9 (2) 4
(3) 6 (4) 5
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

139. A number of boys raised Rs. 12,544 for a famine fund, each boy has given as many rupees as there were boys. The number of boys was :
(1) 102 (2) 112
(3) 122 (4) 132
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

140. The sum of three positive numbers is 18 and their product is 162. If the sum of two numbers is equal to the third number, then the sum of squares of the numbers is
(1) 120 (2) 126
(3) 132 (4) 138
(SSC CGL Tier-II Online Exam.01.12.2016)

141. three numbers are such that their sum is 50, product is 3750 and the sum of their reciprocals is $\frac{31}{150}$. Find the sum of the squares of the three numbers.
(1) 2500 (2) 1250
(3) 950 (4) 122
(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

142. The greatest perfect square number of 6 digits is
(1) 999001 (2) 998001
(3) 998009 (4) 998101
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (Ist Sitting)

143. If a perfect square, not divisible by 6, be divided by 6, the remainder will be
(1) 1, 3 or 5 (2) 1, 2 or 5
(3) 1, 3 or 4 (4) 1, 2 or 4
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (Ist Sitting)

144. Find the least number which must be subtracted from 18265 to make it a perfect square.
(1) 30 (2) 38
(3) 40 (4) 45
(SSC CGL Tier-I (CBE) Exam. 07.09.2016) (Ist Sitting)

145. If the sum of squares of two real numbers is 41 and their sum is 9, then the sum of cubes of these two numbers is
(1) 169 (2) 209
(3) 189 (4) 198
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

146. The product of two positive integers is 2048 and one of them is twice the other. The smaller number is
(1) 32 (2) 64
(3) 16 (4) 1024
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (Ist Sitting)

147. A number when divided by 6 leaves remainder 3. When the square of the same number is divided by 6, the remainder is:
(1) 0 (2) 2
(3) 1 (4) 3
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

148. Each member of a club contributes as much rupees and as much paise as the number of members of the club. If the total contribution is Rs. 2525, then the number of members of the club is
(1) 60 (2) 45
(3) 55 (4) 50
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

149. The sum of squares of three positive integers is 323. If the sum of squares of two numbers is twice the third, their product is
(1) 255 (2) 260
(3) 265 (4) 270
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

150. The difference between two numbers is 9 and the difference between their squares is 207. The numbers are :
(1) 17 and 8 (2) 16 and 7
(3) 15 and 6 (4) 23 and 14
(SSC CGL Tier-I (CBE) Exam. 28.08.2016 (IST Sitting)

151. The least number that must be subtracted from 63520 to make the result a perfect square is
(1) 30 (2) 24
(3) 14 (4) 16
(SSC CGL Tier-I (CBE) Exam. 30.08.2016 (IIIrd Sitting)

152. The least six digit number which is a perfect square is
(1) 100489 (2) 100000
(3) 100256 (4) 100225
(SSC CGL Tier-I (CBE) Exam. 01.09.2016 (IIIrd Sitting)

153. The sum of two positive integers is 80 and the difference between them is 20. What is the difference between squares of those numbers ?
(1) 1400 (2) 1600
(3) 1800 (4) 2000
(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IIIrd Sitting)

154. Twenty one times of a positive number is less than its square by 100. The value of the positive number is
(1) 25 (2) 26
(3) 42 (4) 41
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

155. A General of an Army wants to create a formation of square from 36562 army men. After arrangement, he found some army men remained unused. Then the number of such army men remained unused was
(1) 36 (2) 65
(3) 81 (4) 97
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

156. The least number to be subtracted from 16800 to make it a perfect square is
(1) 169 (2) 219
(3) 159 (4) 249
(SSC Multi-Tasking Staff Exam. 30.04.2017)

TYPE–IV

1. The sum of the cubes of the numbers 22, –15 and –7 is equal to
(1) 6930 (2) 9630
(3) 3 (4) 0
(SSC CPO S.I. Exam. 05.09.2004)

2. $\frac{\sqrt[3]{8}}{\sqrt{16}} \div \sqrt{\frac{100}{49}} \times \sqrt[3]{125}$ is equal to :
(1) 7 (2) $1\frac{3}{4}$
(3) $\frac{7}{100}$ (4) $\frac{4}{7}$
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

3. $\sqrt[3]{\frac{72.9}{0.4096}}$ is equal to :
(1) 0.5625 (2) 5.625
(3) 182 (4) 13.6
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

4. $(5.5)^3-(4.5)^3$ is equal to :
(1) 1 (2) 75
(3) 74.25 (4) 75.25
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

5. The value of $\sqrt[3]{\frac{7}{875}}$ is equal to
(1) $\frac{1}{3}$ (2) $\frac{1}{15}$
(3) $\frac{1}{4}$ (4) $\frac{1}{5}$
(SSC CPO S.I. Exam. 07.09.2003)

6. $\sqrt[3]{\frac{19}{513}}$ is equal to
(1) $\frac{1}{9}$ (2) $\frac{1}{3}$
(3) $\frac{1}{\sqrt{27}}$ (4) $\frac{1}{\sqrt{3}}$
(SSC CPO S.I. Exam. 05.09.2004)

7. $\sqrt[3]{(333)^3+(333)^3+(334)^3-3\times333\times333\times334}$ is equal to
(1) 12 (2) 11
(3) 10 (4) 15
(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

8. If cube root of 175616 is 56, then the value of $\sqrt[3]{175.616}+\sqrt[3]{0.175616}+\sqrt[3]{0.000175616}$ is equal to :
(1) 0.168 (2) 62.16
(3) 6.216 (4) 6.116
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

9. $\sqrt[3]{\sqrt{0.000064}}$ is equal to
(1) 0.0002 (2) 0.002
(3) 0.02 (4) 0.2
(SSC CISF ASI Exam 29.08.2010 (Paper-1)

10. $\sqrt[3]{15612+\sqrt{154+\sqrt{225}}}$ is equal to
(1) 15 (2) 25
(3) 75 (4) 125
(SSC (South Zone) Investigator Exam 12.09.2010)

11. $\sqrt[3]{0.000125}$ is equal to
(1) 0.5 (2) 0.15
(3) 0.05 (4) 0.005
(SSC (South Zone) Investigator Exam 12.09.2010)

12. The sum of the squares of 2 numbers is 146 and the square root of one of them is $\sqrt{5}$. The cube of the other number is
(1) 1111 (2) 1221
(3) 1331 (4) 1441
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

13. $\left(\sqrt[3]{1000}+\sqrt[3]{0.008}-\sqrt[3]{0.125}\right)$ is equal to
(1) 9.7 (2) 9.97
(3) 9.997 (4) 9.9997
(SSC CPO S.I. Exam 12.12.2010 (Paper-I)

14. $\sqrt[3]{1-\frac{127}{343}}$ is equal to
(1) $\frac{5}{9}$ (2) $1-\frac{1}{7}$
(3) $\frac{4}{7}$ (4) $1-\frac{2}{7}$
(SSC CGL Tier-1 Exam 26.06.2011 (First Sitting)

15. If $\sqrt[3]{3^n}=27$, then the value of n is :
(1) 9 (2) 6
(3) 1 (4) 3
(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

16. The value of $\sqrt{\sqrt[3]{0.000729}}$ is
(1) 0.9 (2) 0.3
(3) 0.03 (4) 0.09
(SSC Multi-Tasking Staff Exam. 10.03.2013, Ist Sitting : Patna)

17. The value of $\left(\sqrt{4^3+15^2}\right)^3$ is :
(1) 4913 (2) 4313
(3) 4193 (4) 3943
(SSC Multi-Tasking Staff Exam. 10.03.2013)

18. $\sqrt[3]{4\frac{12}{125}}$ is equal to
(1) 1.4 (2) 1.6
(3) 1.8 (4) 2.4
(SSC CPO Sub Inspector Exam. 06.09.2009) & SSC CPO S.I. Exam. 12.12.2010 (Paper-I) & SSC MTS Exam. 17.03.2013 (Ist Sitting)

19. By which smallest number 1323 must be multiplied, so that it becomes a perfect cube?
(1) 2 (2) 3
(3) 5 (4) 7
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

20. Sum of digits of the smallest number by which 1440 be multiplied so that it becomes a perfect cube, is
(1) 4 (2) 6
(3) 7 (4) 8
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

21. The sum of the digits of the smallest number which, when multiplied by 1800, gives a perfect cube, is :
(1) 2 (2) 3
(3) 6 (4) 8
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

22. Which smallest number must be added to 710 so that the sum is a perfect cube ?
(1) 29 (2) 19
(3) 11 (4) 21
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

23. The least number, by which 1944 must be multiplied so as to make the result a perfect cube, is
(1) 2 (2) 3
(3) 6 (4) 13
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

24. The smallest natural number, by which 3000 must be divided to make the quotient a perfect cube, is :
(1) 3 (2) 4
(3) 5 (4) 6
(SSC CPO S.I. Exam. 16.12.2007)

25. The smallest positive integer n, for which $864n$ is a perfect cube, is :
(1) 1 (2) 2
(3) 3 (4) 4
(SSC CPO S.I. Exam. 16.12.2007)

26. By what least number should 675 be multiplied so as to obtain a perfect cube number ?
(1) 3 (2) 5
(3) 24 (4) 40
(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

27. The least number, that must be added to 1720 so as to obtain a perfect cube, is
(1) 7 (2) 8
(3) 11 (4) 13
(SSC SAS Exam 26.06.2010 (Paper-1)

28. By what least number should 4320 be multiplied so as to obtain a number which is a perfect cube ?
(1) 40 (2) 50
(3) 60 (4) 80
(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

29. Which of the following is a perfect square as well as a cube?
343, 125, 81, or 64
(1) 81 (2) 125
(3) 343 (4) 64
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

30. The square of a natural number subtracted from its cube is 48. The number is :
(1) 8 (2) 6
(3) 5 (4) 4
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

31. The least possible value of A for which 90 × A is a perfect cube is
(1) 200 (2) 300
(3) 500 (4) 600
(SSC CPO S.I. Exam. 12.01.2003

32. If the square root of x is the cube root of y, then the relation between x and y is
(1) $x^3 = y^2$ (2) $x^2 = y^3$
(3) $x = y$ (4) $x^6 = y^5$
FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I) North Zone (Ist Sitting)

33. If $x = \sqrt{3} + \sqrt{2}$ then the value of $x^3 - \frac{1}{x^3}$ is
(1) $10\sqrt{2}$ (2) $14\sqrt{2}$
(3) $22\sqrt{2}$ (4) $8\sqrt{2}$
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

34. The value of $(1001)^3$ is
(1) 1003003001
(2) 100303001
(3) 100300301
(4) 103003001
(SSC CGL Tier-I Exam. 26.10.2014)

35. What is the smallest number by which 625 must be divided so that the quotient is a perfect cube ?
(1) 25 (2) 5
(3) 2 (4) 3
(SSC CGL Tier-II Exam. 21.09.2014)

36. The sum of the cubes of two numbers is 793. The sum of the numbers is 13. Then the difference of the two numbers is
(1) 7 (2) 6
(3) 5 (4) 8
(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

37. The smallest number by which 243000 be divided so that the quotient is a perfect cube is
(1) 3 (2) 27
(3) 9 (4) 1
(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

38. When simplified, the product $\left(2-\frac{1}{3}\right)\left(2-\frac{3}{5}\right)\left(2-\frac{5}{7}\right)....\left(2-\frac{997}{999}\right)$ equals
(1) $\frac{5}{999}$ (2) $\frac{5}{3}$
(3) $\frac{1001}{999}$ (4) $\frac{1001}{3}$
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 IInd Sitting)

39. If the cube root of 79507 is 43, then the value of $\sqrt[3]{79.507} + \sqrt[3]{0.079507} + \sqrt[3]{0.000079507}$ is
(1) 0.4773 (2) 477.3
(3) 47.73 (4) 4.773
(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

40. Find the cube root of (–13824).
or
Find the value of $\sqrt[3]{-13824}$.
(1) 38 (2) –38
(3) 24 (4) –24
(SSC CGL Tier-II Online Exam.01.12.2016)

41. The cube of 105 is
(1) 1157625 (2) 1175625
(3) 1185625 (4) 1158625
(SSC CGL Tier-I (CBE) Exam. 09.09.2016) (Ist Sitting)

42. The least number which when divides 37044, gives the result a perfect cube, is :
(1) 2 (2) 4
(3) 14 (4) 21
(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IIIrd Sitting)

43. The cube of 997 is :
(1) 991026973 (2) 991029673
(3) 991029773 (4) 991097273
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IInd Sitting)

44. The sum of the cubes of two numbers in the ratio 3 : 4 is 5824. The sum of the numbers is :
(1) $(5824)^{\frac{1}{3}}$ (2) 28
(3) 24 (4) 14
(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IIIrd Sitting)

TYPE–V

1. The simplified value of

$$\frac{(0.0539 - 0.002) \times 0.4 + 0.56 \times 0.07}{0.04 \times 0.25} = ?$$

(1) 59.96 (2) 0.5996
(3) 5.996 (4) 599.6

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

SHORT ANSWERS

TYPE-I

1. (1)	**2.** (1)	**3.** (4)	**4.** (3)
5. (1)	**6.** (3)	**7.** (2)	**8.** (4)
9. (2)	**10.** (3)	**11.** (1)	**12.** (4)
13. (4)	**14.** (4)	**15.** (3)	**16.** (1)
17. (2)	**18.** (1)	**19.** (3)	**20.** (3)
21. (1)	**22.** (3)	**23.** (4)	**24.** (3)
25. (*)	**26.** (1)		

TYPE-II

1. (3)	**2.** (1)	**3.** (3)	**4.** (3)
5. (1)	**6.** (2)	**7.** (1)	**8.** (1)
9. (2)	**10.** (4)	**11.** (2)	**12.** (1)
13. (1)	**14.** (3)	**15.** (4)	**16.** (1)
17. (1)	**18.** (1)	**19.** (4)	**20.** (3)
21. (3)	**22.** (3)	**23.** (2)	**24.** (2)
25. (4)	**26.** (2)	**27.** (2)	**28.** (1)
29. (4)	**30.** (4)	**31.** (1)	**32.** (2)
33. (3)	**34.** (3)	**35.** (2)	**36.** (2)
37. (1)	**38.** (3)	**39.** (1)	**40.** (3)
41. (2)	**42.** (4)	**43.** (2)	**44.** (2)
45. (4)	**46.** (2)	**47.** (4)	**48.** (2)
49. (1)	**50.** (3)	**51.** (4)	**52.** (3)
53. (2)	**54.** (1)	**55.** (1)	**56.** (4)
57. (3)	**58.** (4)	**59.** (4)	**60.** (2)
61. (1)	**62.** (2)	**63.** (1)	**64.** (4)
65. (4)	**66.** (4)	**67.** (1)	**68.** (4)
69. (3)	**70.** (1)	**71.** (4)	**72.** (4)
73. (1)	**74.** (2)	**75.** (3)	**76.** (2)
77. (4)	**78.** (3)	**79.** (1)	**80.** (2)
81. (2)	**82.** (1)	**83.** (2)	**84.** (*)
85. (4)	**86.** (1)	**87.** (4)	**88.** (4)

TYPE-III

1. (3)	**2.** (3)	**3.** (1)	**4.** (4)
5. (4)	**6.** (3)	**7.** (2)	**8.** (2)
9. (2)	**10.** (3)	**11.** (4)	**12.** (2)
13. (1)	**14.** (4)	**15.** (4)	**16.** (4)
17. (4)	**18.** (2)	**19.** (2)	**20.** (2)
21. (1)	**22.** (4)	**23.** (2)	**24.** (4)
25. (1)	**26.** (3)	**27.** (3)	**28.** (3)
29. (2)	**30.** (3)	**31.** (1)	**32.** (3)
33. (2)	**34.** (4)	**35.** (2)	**36.** (1)
37. (2)	**38.** (2)	**39.** (2)	**40.** (2)
41. (2)	**42.** (4)	**43.** (3)	**44.** (4)
45. (2)	**46.** (3)	**47.** (3)	**48.** (4)
49. (3)	**50.** (3)	**51.** (3)	**52.** (2)
53. (3)	**54.** (2)	**55.** (1)	**56.** (4)
57. (1)	**58.** (3)	**59.** (3)	**60.** (2)
61. (3)	**62.** (3)	**63.** (2)	**64.** (2)
65. (2)	**66.** (2)	**67.** (1)	**68.** (3)
69. (2)	**70.** (3)	**71.** (4)	**72.** (2)
73. (1)	**74.** (4)	**75.** (4)	**76.** (3)
77. (4)	**78.** (2)	**79.** (1)	**80.** (3)
81. (1)	**82.** (4)	**83.** (3)	**84.** (4)
85. (2)	**86.** (3)	**87.** (3)	**88.** (3)
89. (3)	**90.** (3)	**91.** (1)	**92.** (3)
93. (3)	**94.** (1)	**95.** (4)	**96.** (3)
97. (1)	**98.** (3)	**99.** (2)	**100.** (1)
101. (4)	**102.** (3)	**103.** (3)	**104.** (4)
105. (3)	**106.** (2)	**107.** (4)	**108.** (3)
109. (3)	**110.** (3)	**111.** (4)	**112.** (4)
113. (1)	**114.** (2)	**115.** (4)	**116.** (4)
117. (1)	**118.** (1)	**119.** (3)	**120.** (2)
121. (2)	**122.** (4)	**123.** (2)	**124.** (2)
125. (1)	**126.** (1)	**127.** (4)	**128.** (4)
129. (3)	**130.** (1)	**131.** (3)	**132.** (3)
133. (4)	**134.** (2)	**135.** (4)	**136.** (1)
137. (2)	**138.** (1)	**139.** (2)	**140.** (2)
141. (3)	**142.** (2)	**143.** (3)	**144.** (3)
145. (3)	**146.** (1)	**147.** (4)	**148.** (4)
149. (1)	**150.** (2)	**151.** (4)	**152.** (1)
153. (2)	**154.** (1)	**155.** (3)	**156.** (3)

TYPE-IV

1. (1)	**2.** (2)	**3.** (2)	**4.** (4)
5. (4)	**6.** (2)	**7.** (3)	**8.** (3)
9. (4)	**10.** (2)	**11.** (3)	**12.** (3)
13. (1)	**14.** (2)	**15.** (1)	**16.** (2)
17. (1)	**18.** (2)	**19.** (4)	**20.** (2)
21. (3)	**22.** (2)	**23.** (2)	**24.** (1)
25. (2)	**26.** (2)	**27.** (2)	**28.** (2)
29. (4)	**30.** (4)	**31.** (2)	**32.** (1)
33. (3)	**34.** (1)	**35.** (2)	**36.** (3)
37. (3)	**38.** (4)	**39.** (4)	**40.** (4)
41. (1)	**42.** (2	**43.** (1)	**44.** (2)

TYPE-V

1. (3)			

EXPLANATIONS

TYPE-I

1. (1)

$$? = 1 + \cfrac{1}{1 + \cfrac{2}{2 + \cfrac{3}{1 + \cfrac{4}{5}}}}$$

$$= 1 + \cfrac{1}{1 + \cfrac{2}{2 + \cfrac{3 \times 5}{5 + 4}}} \quad = 1 + \cfrac{1}{1 + \cfrac{2}{2 + \cfrac{5}{3}}}$$

$$= 1 + \cfrac{1}{1 + \cfrac{2 \times 3}{6 + 5}} \quad = 1 + \frac{1 \times 11}{11 + 6}$$

$$= 1 + \frac{11}{17} \quad = 1\frac{11}{17}$$

2. (1) $? = 1 + \cfrac{2}{1 + \cfrac{3 \times 5}{9}} = 1 + \cfrac{2}{1 + \cfrac{5}{3}}$

$$= 1 + \frac{2 \times 3}{8} = \frac{7}{4}$$

3. (4) $\cfrac{1}{3 + \cfrac{1}{2 - \cfrac{1}{\cfrac{7}{9}}}} + \frac{17}{22}$

$$= \frac{1}{3+\frac{1}{2-\frac{9}{7}}} + \frac{17}{22}$$

$$= \frac{1}{3+\frac{1}{\frac{14-9}{7}}} + \frac{17}{22}$$

$$= \frac{1}{3+\frac{1}{\frac{5}{7}}} + \frac{17}{22} = \frac{1}{3+\frac{7}{5}} + \frac{17}{22}$$

$$= \frac{1}{\frac{15+7}{5}} + \frac{17}{22}$$

$$= \frac{5}{22} + \frac{17}{2} = \frac{22}{22} = 1$$

4. (3) $x = 1 + \cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{2}}}}$

$$= 1 + \frac{1}{1+\frac{1}{1+\frac{1}{\frac{3}{2}}}} = 1 + \frac{1}{1+\frac{1}{1+\frac{2}{3}}}$$

$$= 1 + \frac{1}{1+\frac{1}{\frac{5}{3}}} = 1 + \frac{1}{1+\frac{3}{5}}$$

$$= 1 + \frac{1}{\frac{8}{5}} = 1 + \frac{5}{8} = \frac{13}{8}$$

$$\therefore 2x + \frac{7}{4} = 2 \times \frac{13}{8} + \frac{7}{4}$$

$$= \frac{13+7}{4} = \frac{20}{4} = 5$$

5. (1) $\cfrac{19}{43} \div \cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\frac{1}{4}}}}$

$$= \frac{19}{43} \div \frac{1}{2+\frac{1}{3+\frac{4}{5}}}$$

$$= \frac{19}{43} \div \frac{1}{2+\frac{5}{19}} = \frac{19}{43} \div \frac{19}{43}$$

$$= \frac{19}{43} \times \frac{43}{19} = 1$$

6. (3) $\cfrac{5}{3+\cfrac{3}{\frac{3-2}{3}}} = \cfrac{5}{3+\cfrac{3}{\frac{1}{3}}}$

$$\frac{5}{3+3\times 3} = \frac{5}{3+9} = \frac{5}{12}$$

7. (2) $\quad 2 = x + \cfrac{1}{1+\cfrac{1}{3+\frac{1}{4}}}$

$$\Rightarrow 2 = x + \frac{1}{1+\frac{1}{\frac{12+1}{4}}}$$

$$\Rightarrow 2 = x + \frac{1}{1+\frac{4}{13}}$$

$$\Rightarrow 2 = x + \frac{1}{\frac{13+4}{13}}$$

$$\Rightarrow 2 = x + \frac{1}{\frac{17}{13}}$$

$$\Rightarrow 2 = x + \frac{13}{17} \Rightarrow x = 2 - \frac{13}{17}$$

$$= \frac{34-13}{17} = \frac{21}{17}$$

8. (4) $\cfrac{2}{1+\cfrac{1}{\frac{1}{2}}} \times \cfrac{3}{\left(\frac{5}{6}\times\frac{3}{2}\right) \div \frac{5}{4}}$

$$= \frac{2}{1+2} \times \frac{3}{\frac{5}{4} \div \frac{5}{4}}$$

$$= \frac{2}{3} \times \frac{3}{\frac{5}{4}\times\frac{4}{5}} = \frac{2}{3} \times 3 = 2$$

9. (2) $1 + \cfrac{4}{2+\cfrac{3}{\frac{10-1}{2}}} - \frac{1}{2} \times 5$

$$= 1 + \frac{4}{2+\frac{6}{9}} - \frac{5}{2} = 1 + \frac{4}{2+\frac{2}{3}} - \frac{5}{2}$$

$$= 1 + \frac{4}{\frac{8}{3}} - \frac{5}{2} = 1 + \frac{4\times 3}{8} - \frac{5}{2}$$

$$= 1 + \frac{3}{2} - \frac{5}{2} = \frac{2+3-5}{2} = 0$$

10. (3) Suppose that

$$1 + \frac{1}{10+\frac{1}{10}} = \frac{111}{101} = a$$

and, $1 - \cfrac{1}{10+\cfrac{1}{10}} = \frac{91}{101} = b.$

$$\therefore \frac{a^2-b^2}{(a+b)} = \frac{(a+b)(a-b)}{(a+b)}$$

= (a – b)

$$= \frac{111}{101} - \frac{91}{101} = \frac{20}{101}$$

11. (1) $\cfrac{\frac{79}{14}}{5+\cfrac{3}{3+\frac{5}{3}}}$

$$= \frac{\frac{79}{14}}{5+\frac{3}{\frac{9+5}{3}}}$$

$$= \frac{\frac{79}{14}}{5+\frac{9}{14}} = \frac{\frac{79}{14}}{\frac{70+9}{14}}$$

$$= \frac{79}{14} \times \frac{14}{79} = 1$$

12. (4) $\cfrac{2}{2+\cfrac{2}{3+\cfrac{2}{\frac{11}{3}}} \times 0.39}$

$$= \frac{2}{2+\frac{2}{3+\frac{6}{11}} \times 0.39}$$

$$= \frac{2}{2+\frac{2}{\frac{33+6}{11}\times 0.39}}$$

$$= \frac{2}{2+\frac{11\times 2}{39}\times 0.39}$$

$$= \frac{2}{2+\frac{11\times 2}{39}\times\frac{39}{100}}$$

$$= \frac{2}{2+\frac{11}{50}} = \frac{2}{\frac{100+11}{50}}$$

$$= \frac{100}{111}$$

13. (4) Expression $= 1 + \frac{1}{1+\frac{1}{2}}$

$$= 1+\frac{1}{\frac{2+1}{2}} = 1+\frac{2}{3} = \frac{3+2}{3} = \frac{5}{3}$$

14. (4) Check through options

$$\frac{1}{3+\frac{1}{1+\frac{1}{2+\frac{1}{4}}}}$$

$$= \frac{1}{3+\frac{1}{1+\frac{1}{\frac{8+1}{4}}}} = \frac{1}{3+\frac{1}{1+\frac{4}{9}}}$$

$$= \frac{1}{3+\frac{1}{\frac{9+4}{9}}} = \frac{1}{3+\frac{9}{13}} = \frac{1}{\frac{39+9}{13}} = \frac{13}{48}$$

15. (3) Expression

$$= 1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{3+2}{3}}}}$$

$$= 1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{3}{5}}}}$$

$$= 1+\frac{1}{1+\frac{1}{1+\frac{1}{\frac{5+3}{5}}}}$$

$$= 1+\frac{1}{1+\frac{1}{1+\frac{5}{8}}}$$

$$= 1+\frac{1}{1+\frac{1}{\frac{8+5}{8}}}$$

$$= 1+\frac{1}{1+\frac{8}{13}} = 1+\frac{1}{\frac{13+8}{13}}$$

$$= 1+\frac{13}{21} = \frac{21+13}{21} = \frac{34}{21}$$

16. (1) Expression

$$= \frac{\frac{7}{3}-\frac{13}{11}}{3+\frac{1}{3+\frac{1}{\frac{9+1}{3}}}} = \frac{\frac{77-39}{33}}{3+\frac{1}{3+\frac{3}{10}}}$$

$$= \frac{\frac{38}{33}}{3+\frac{1}{\frac{30+3}{10}}} = \frac{\frac{38}{33}}{3+\frac{10}{33}}$$

$$= \frac{\frac{38}{33}}{\frac{99+10}{33}} = \frac{38}{33}\times\frac{33}{109} = \frac{38}{109}$$

17. (2) Expression $= 3+\frac{3}{3+\frac{1}{\frac{9+1}{3}}}$

$$= 3+\frac{3}{3+\frac{3}{10}} = 3+\frac{3}{\frac{30+3}{10}}$$

$$= 3+\frac{30}{33} = 3+\frac{10}{11} = \frac{33+10}{11} = \frac{43}{11}$$

18. (1) Expression $= 1+\frac{1}{1+\frac{1}{5}}$

$$= 1+\frac{1}{\frac{5+1}{5}} = 1+\frac{5}{6} = \frac{6+5}{6} = \frac{11}{6}$$

19. (3) First part $= \frac{\frac{30}{7}-\frac{1}{2}}{\frac{7}{2}+\frac{8}{7}}$

$$= \frac{\frac{60-7}{14}}{\frac{49+16}{14}} = \frac{53}{14}\times\frac{14}{65} = \frac{53}{65}$$

Second part $= \frac{1}{2+\frac{1}{2+\frac{1}{\frac{25-1}{5}}}}$

$$= \frac{1}{2+\frac{1}{2+\frac{5}{24}}} = \frac{1}{2+\frac{1}{\frac{48+5}{24}}}$$

$$= \frac{1}{2+\frac{24}{53}} = \frac{1}{\frac{106+24}{53}}$$

$$= \frac{53}{130}$$

$\therefore$ Expression

$$= \frac{53}{65}\div\frac{53}{130} = \frac{53}{65}\times\frac{130}{53} = 2$$

20. (3)

$$4-\frac{5}{1+\frac{1}{3+\frac{1}{\frac{9}{4}}}} = 4-\frac{5}{1+\frac{1}{3+\frac{4}{9}}}$$

$$= 4-\frac{5}{1+\frac{1}{\frac{27+4}{9}}} = 4-\frac{5}{1+\frac{9}{31}}$$

$$= 4-\frac{5}{\frac{40}{31}} = 4-\frac{5\times 31}{40}$$

$$= 4-\frac{31}{8} = \frac{32-31}{8} = \frac{1}{8}$$

$\because$ Time taken in completing $\frac{1}{8}$ part = 10 minutes

$\therefore$ Time taken in completing $\frac{3}{5}$ part

$= 10 \times 8 \times \frac{3}{5}$

$= 48$ minutes

21. (1) $\dfrac{4\frac{1}{7}-2\frac{1}{4}}{3\frac{1}{2}+1\frac{1}{7}} = \dfrac{\frac{29}{7}-\frac{9}{4}}{\frac{7}{2}+\frac{8}{7}}$

$= \dfrac{\frac{116-63}{28}}{\frac{49+16}{14}} = \dfrac{53}{28} \times \dfrac{14}{65} = \dfrac{53}{130}$

Again,

$\dfrac{1}{2+\frac{1}{2+\frac{1}{\frac{25-1}{5}}}} = \dfrac{1}{2+\frac{1}{2+\frac{5}{24}}}$

$= \dfrac{1}{2+\frac{1}{\frac{48+5}{24}}} = \dfrac{1}{2+\frac{24}{53}}$

$= \dfrac{1}{\frac{106+24}{53}} = \dfrac{53}{130}$

$\therefore$ Expression $= \sqrt{\dfrac{53}{130} \div \dfrac{53}{130}} = 1$

22. (3) $1+\dfrac{1}{1+\frac{2}{\frac{15+4}{5}}}$

$= 1+\dfrac{1}{1+\frac{2\times 5}{19}} = 1+\dfrac{1}{\frac{19+10}{19}}$

$= 1+\dfrac{19}{29} = \dfrac{29+19}{29} = \dfrac{48}{29}$

23. (4) Expression $= 1-\dfrac{a}{1-\frac{1}{1+\frac{a}{1-a}}}$

$= 1-\dfrac{a}{1-\frac{1}{\frac{1-a+a}{1-a}}}$

$= 1-\dfrac{a}{1-\frac{1}{\frac{1}{1-a}}}$

$= 1-\dfrac{a}{1-(1-a)} = 1-\dfrac{a}{1-1+a}$

$= 1 - 1 = 0$

24. (3) First part $= \dfrac{4\frac{1}{7}-2\frac{1}{7}}{3\frac{1}{2}+1\frac{1}{7}}$

$= \dfrac{\frac{29}{7}-\frac{15}{7}}{\frac{7}{2}+\frac{8}{7}} = \dfrac{\frac{14}{7}}{\frac{49+16}{14}}$

$= \dfrac{2}{\frac{65}{14}} = \dfrac{2\times 14}{65} = \dfrac{28}{65}$

Second part $= \dfrac{1}{2+\frac{1}{2+\frac{1}{\frac{25-1}{5}}}}$

$= \dfrac{1}{2+\frac{1}{2+\frac{5}{24}}} = \dfrac{1}{2+\frac{1}{\frac{48+5}{24}}}$

$= \dfrac{1}{2+\frac{24}{53}} = \dfrac{1}{\frac{106+24}{53}} = \dfrac{53}{130}$

$\therefore$ Expression $= \dfrac{28}{65} \div \dfrac{53}{130}$

$= \dfrac{28}{65} \times \dfrac{130}{53} = \dfrac{56}{53}$

25. (*) Let, $a = 1 + \dfrac{1}{10+\frac{1}{10}}$

$= 1 + \dfrac{1}{\frac{100+1}{10}} = 1+\dfrac{10}{101}$

$= \dfrac{101+10}{101} = \dfrac{111}{101}$

Again,

$b = 1-\dfrac{1}{10+\frac{1}{10}} = 1-\dfrac{1}{\frac{100+1}{10}}$

$= 1-\dfrac{10}{101}$

$= \dfrac{101-10}{101} = \dfrac{91}{101}$

$\therefore$ Expression

$= \left(a^2-b^2\right) \div ab$

$= \{(a+b)\ (a-b)\} \div ab$

$= \left(\dfrac{111}{101}+\dfrac{91}{101}\right)\left(\dfrac{111}{101}-\dfrac{91}{101}\right) \div \left(\dfrac{111}{101}\times\dfrac{91}{101}\right)$

$= \dfrac{202}{101} \times \dfrac{20}{101} \times \dfrac{101\times 101}{111\times 91}$

$= \dfrac{4040}{10101}$

26. (1) Expression

$= 4-\dfrac{5}{1+\frac{1}{3+\frac{1}{\frac{8+1}{4}}}}$

$= 4-\dfrac{5}{1+\frac{1}{3+\frac{4}{9}}} = 4-\dfrac{5}{1+\frac{1}{\frac{27+4}{9}}}$

$= 4-\dfrac{5}{1+\frac{9}{31}} = 4-\dfrac{5}{\frac{31+9}{31}}$

$= 4-\dfrac{5\times 31}{40} = \dfrac{160-155}{40}$

$= \dfrac{5}{40} = \dfrac{1}{8}$

TYPE-II

1. (3) $? = \dfrac{9|3-5|-5|4|\div 10}{-3(5)-2\times 4\div 2}$

$= \dfrac{9\times 2-5\times 4\div 10}{-15-8\div 2}$

$= \dfrac{18-2}{-19} = -\dfrac{16}{19}$

2. (1) Using Rule 1,

$? = 5 - [4 - \{3 - (3 - 3 - 6)\}]$

$= 5 - [4 - \{3 - (-6)\}]$

$= 5 - [4 - \{3 + 6\}]$

$= 5 - [4 - 9]$

$= 5 + 5 = 10$

3. (3) $? = \frac{-(-2)^2 + 6 + 6}{18 - 15}$

$= \frac{-4 + 12}{3} = \frac{8}{3}$

4. (3) Using Rule 1,

$$\frac{\frac{5}{3} \times \frac{7}{51} \text{ of } \frac{17}{5} - \frac{1}{3}}{\frac{2}{9} \times \frac{5}{7} \text{ of } \frac{28}{5} - \frac{2}{3}}$$

$$= \frac{\frac{5}{3} \times \frac{7}{15} - \frac{1}{3}}{\frac{2}{9} \times 4 - \frac{2}{3}}$$

$$= \frac{\frac{7}{9} - \frac{1}{3}}{\frac{8}{9} - \frac{2}{3}} = \frac{4}{9} \times \frac{9}{2} = 2$$

5. (1) Using Rule 1,
$? = 1 - [5 - \{2 + (-1)2\}]$
$= 1 - [5 - \{2 - 2\}]$
$= 1 - [5 - 0]$
$= 1 - 5 = -4$

6. (2) Using Rule 1,
$3034 - (1002 \div 20.04)$

$= 3034 - \frac{1002}{20.04}$

$= 3034 - \frac{1002}{2004} \times 100$

$= 3034 - 50 = 2984$

7. (1) Using Rule 1,

$$(100)^{\frac{1}{2}} \times (0.001)^{\frac{1}{3}} - (0.0016)^{\frac{1}{4}} \times 3^0 + \left(\frac{5}{4}\right)^{-1}$$

$= 10 \times 0.1 - 0.2 \times 1 + \frac{4}{5}$

$= 1 - 0.2 + 0.8 = 1.6$

8. (1) Using Rule 1,

$$? = \left(\frac{1}{2} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6}\right) \div \left(\frac{2}{5} - \frac{5}{9} + \frac{3}{5} - \frac{7}{18}\right)$$

$$= \left(\frac{30 - 15 + 12 - 10}{60}\right) \div \left(\frac{36 - 50 + 54 - 35}{90}\right)$$

$$= \left(\frac{17}{60}\right) \div \left(\frac{5}{90}\right) = \frac{17}{60} \times 18$$

$$= \frac{51}{10} = 5\frac{1}{10}$$

9. (2) Using Rule 1,

$$8\frac{1}{2} - \left[3\frac{1}{4} \div \left\{1\frac{1}{4} - \frac{1}{2}\left(1\frac{1}{2} - \frac{1}{3} - \frac{1}{6}\right)\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{3}{2} - \frac{1}{3} - \frac{1}{6}\right)\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{9 - 2 - 1}{6}\right)\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2} \times \frac{6}{6}\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{13}{4} \div \left\{\frac{5 - 2}{4}\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{13}{4} \div \frac{3}{4}\right]$$

$$= \frac{17}{2} - \left[\frac{13}{4} \times \frac{4}{3}\right] = \frac{17}{2} - \frac{13}{3}$$

$$= \frac{51 - 26}{6} = \frac{25}{6} = 4\frac{1}{6}$$

10. (4) Let the value of * be x.

$$\therefore \frac{50}{x} = \frac{x}{12\frac{1}{2}}$$

$$\Rightarrow \frac{50}{x} = \frac{2x}{25}$$

$\Rightarrow 2x^2 = 50 \times 25$
$\Rightarrow x^2 = 25 \times 25$
$\therefore x = 25$

11. (2) Using Rule 1,
$0.008 \times 0.01 \times 0.072 \div (0.12 \times 0.0004)$
$= 0.008 \times 0.01 \times 0.072 \div (0.000048)$

$$= 0.008 \times 0.01 \times \frac{0.072}{0.000048}$$

$$= \frac{0.00000576}{0.000048} = 0.12$$

12. (1) Using Rule 1,

$$\frac{2}{3} \times \frac{3}{\frac{5}{6} \div \frac{2}{3} \text{ of } 1\frac{1}{4}}$$

$$= \frac{2}{3} \times \frac{3}{\frac{5}{6} \div \frac{2}{3} \text{ of } \frac{5}{4}}$$

$$= \frac{2}{3} \times \frac{3}{\frac{5}{6} \div \frac{10}{12}}$$

$$= \frac{2}{3} \times \frac{3}{\frac{5}{6} \times \frac{12}{10}} = \frac{2}{3} \times \frac{3}{1} = 2$$

13. (1)

$$\frac{1}{9} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} + \frac{1}{72}$$

$$= \frac{1}{9} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \frac{1}{5 \times 6} + \ldots \frac{1}{8 \times 9}$$

$$= \frac{1}{9} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + \ldots + \frac{1}{8} - \frac{1}{9} = \frac{1}{2}$$

Aliter :
Using Rule 2,

$$\frac{1}{9} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} + \frac{1}{72}$$

$$= \frac{1}{9} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \frac{1}{5 \times 6} + \frac{1}{6 \times 7} + \frac{1}{7 \times 8} + \frac{1}{8 \times 9}$$

$$= \frac{1}{9} + \left[\frac{1}{2} - \frac{1}{(2 + 7)}\right]$$

$\because$ n = 2 and r = 7

$$= \frac{1}{9} + \frac{1}{2} - \frac{1}{9} = \frac{1}{2}$$

14. (3) Using Rule 1,
Expression
$= 25 - 5 [2 + 3 \{2 - 2(5 - 3) + 5\} - 10] \div 4$
$= 25 - 5 [2 + 3 \{2 - 2 \times 2 + 5\} - 10] \div 4$
$= 25 - 5 [2 + 9 - 10] \div 4$

$$= 25 - 5 \div 4 = 25 - \frac{5}{4}$$

$$= \frac{100 - 5}{4} = \frac{95}{4} = 23.75$$

15. (4) Using Rule 1,
We have

$$\frac{5}{3}\div\frac{2}{7}\times\frac{*}{7}=\frac{5}{4}\times\frac{2}{3}\times 6$$

$$\Rightarrow \frac{5}{3}\times\frac{7}{2}\times\frac{*}{7}=\frac{5\times 2\times 6}{4\times 3}$$

$$\therefore * = \frac{5\times 2\times 6\times 3\times 2\times 7}{5\times 7\times 4\times 3}=6$$

16. (1) Using Rule 1,
Expression

$$= 9-\frac{11}{9}\text{ of }\frac{36}{11}\div\frac{36}{7}\text{of }\frac{7}{9}$$

$$= 9-\frac{11}{9}\times\frac{36}{11}\div\frac{36}{7}\times\frac{7}{9}$$

$$= 9 - 4 \div 4$$

$$= 9-4\times\frac{1}{4}=9-1=8$$

17. (1) Using Rule 1,

$$\frac{5}{\frac{15}{8}\times\frac{4}{3}}\times\frac{\frac{21}{10}}{\frac{7}{2}}of\frac{5}{4}$$

$$=5\times\frac{2}{5}\times\frac{21}{10}\times\frac{2}{7}\times\frac{5}{4}$$

$$=\frac{3}{2}=1\frac{1}{2}$$

18. (1) Using Rule 1,

$$\frac{9}{20}-\left[\frac{1}{5}+\left\{\frac{1}{4}+\left(\frac{5}{6}-\overline{\frac{1}{3}+\frac{1}{2}}\right)\right\}\right]$$

$$=\frac{9}{20}-\left[\frac{1}{5}+\left\{\frac{1}{4}+\left(\frac{5}{6}-\frac{5}{6}\right)\right\}\right]$$

$$=\frac{9}{20}-\left[\frac{1}{5}+\frac{1}{4}\right]=\frac{9}{20}-\frac{9}{20}=0$$

19. (4) $\dfrac{0.8\overline{3}\div 7.5}{2.3\overline{21}-0.0\overline{98}}=\dfrac{\frac{83-8}{90}\div 7.5}{2\frac{321-3}{990}-\frac{98}{990}}$

$$=\frac{\frac{75}{90}\div 7.5}{2\frac{318}{990}-\frac{98}{990}}=\frac{\frac{75}{90}\div 7.5}{2\frac{220}{990}}$$

$$=\frac{7.5}{90\times 7.5}\times\frac{990}{2200}=\frac{1}{20}=0.05$$

20. (3) Let '*' be H

$$\left[\frac{(H)}{21}\times\frac{(H)}{189}\right]=1$$

$$\Rightarrow (H)^2 = 21\times 189$$

$$\Rightarrow H=\sqrt{21\times 189}=63$$

21. (3) $80\times\sqrt{P}=1120$

$$\Rightarrow\sqrt{P}=\frac{1120}{80}=14$$

$$\Rightarrow P=(14)^2=196$$

22. (3) Using Rule 1,

$$\frac{\frac{13}{4}-\frac{5}{6}\times\frac{4}{5}}{\frac{13}{3}\div\frac{1}{5}-\left(\frac{3}{10}+\frac{106}{5}\right)}-\left(\frac{3}{2}\times\frac{5}{3}\right)$$

$$=\frac{\frac{13}{4}-\frac{2}{3}}{\frac{13\times 5}{3}-\left(\frac{3+212}{10}\right)}-\frac{5}{2}$$

$$=\frac{\frac{39-8}{12}}{\frac{65}{3}-\frac{215}{10}}-\frac{5}{2}=\frac{\frac{31}{12}}{\frac{650-645}{30}}-\frac{5}{2}$$

$$=\frac{31}{12}\times\frac{30}{5}-\frac{5}{2}$$

$$=\frac{31}{2}-\frac{5}{2}=\frac{31-5}{2}=\frac{26}{2}=13$$

23. (2) Using Rule 1,

$$\left[\frac{13}{4}\div\left\{\frac{5}{4}-\frac{1}{2}\left(\frac{5}{2}-\frac{3-2}{12}\right)\right\}\right]\div\frac{13}{6}$$

$$=\left[\frac{13}{4}\div\left\{\frac{5}{4}-\frac{1}{2}\left(\frac{5}{2}-\frac{1}{12}\right)\right\}\right]\div\frac{13}{6}$$

$$=\left[\frac{13}{4}\div\left\{\frac{5}{4}-\frac{1}{2}\left(\frac{30-1}{12}\right)\right\}\right]\div\frac{13}{6}$$

$$=\left[\frac{13}{4}\div\left\{\frac{5}{4}-\frac{1}{2}\times\frac{29}{12}\right\}\right]\div\frac{13}{6}$$

$$=\left[\frac{13}{4}\div\left\{\frac{30-29}{24}\right\}\right]\div\frac{13}{6}$$

$$=\left[\frac{13}{4}\div\frac{1}{24}\right]\div\frac{13}{6}$$

$$=\left[\frac{13}{4}\times 24\right]\div\frac{13}{6}$$

$$=13\times 6\times\frac{6}{13}=36$$

24. (2) Using (x) of Basic Formulae
Let 0.1 = a, 0.2 = b and 0.3 = c
Then, we have,

$$\frac{a\times a\times a+b\times b\times b+c\times c\times c-3abc}{a\times a+b\times b+c\times c-ab-bc-ac}$$

$$=\frac{a^3+b^3+c^3-3abc}{a^2+b^2+c^2-ab-bc-ac}$$

$$= a + b + c$$

$$= 0.1 + 0.2 + 0.3 = 0.6$$

25. (4) Using Rule 2,

$$\frac{1}{5\times 6}+\frac{1}{6\times 7}+\frac{1}{7\times 8}+\frac{1}{8\times 9}+\frac{1}{9\times 10}+\frac{1}{10\times 11}$$

$$=\frac{1}{5}-\frac{1}{6}+\frac{1}{6}-\frac{1}{7}+\frac{1}{7}-\frac{1}{8}+\frac{1}{8}-\frac{1}{9}+\frac{1}{9}-\frac{1}{10}+\frac{1}{10}-\frac{1}{11}$$

$$=\frac{1}{5}-\frac{1}{11}=\frac{11-5}{55}=\frac{6}{55}$$

26. (2) Using Rule 1,

I. $=\dfrac{3}{4}\times\dfrac{6}{5}=\dfrac{9}{10}$

II. $=3\div\left[\dfrac{4}{5}\times\dfrac{1}{6}\right]=3\div\dfrac{2}{15}=\dfrac{45}{2}$

III. $=\left[3\div\dfrac{4}{5}\right]\div 6=\dfrac{15}{4}\div 6=\dfrac{5}{8}$

IV. $=3\div 4\times\dfrac{5}{6}=3\div\dfrac{10}{3}=\dfrac{9}{10}$

Obviously, (I) and (IV) are equal

27. (2) Using Rule 1,

$$= 1\div\left[1+1\div\left\{1+1\div(1+1\div 2)\right\}\right]$$

$$=1\div\left[1+1\div\left\{1+1\div\left(1+\frac{1}{2}\right)\right\}\right]$$

$$=1\div\left[1+1\div\left\{1+1\div\frac{3}{2}\right\}\right]$$

$$=1\div\left[1+1\div\left\{1+\frac{2}{3}\right\}\right]=1\div\left[1+1\div\frac{5}{3}\right]$$

$$=1\div\left[1+\frac{3}{5}\right]=1\div\frac{8}{5}=\frac{5}{8}$$

28. (1) Using Rule 1,
The given expression

$$=\frac{\frac{1}{3}\times 3\times\frac{1}{3}}{\frac{1}{3}\div\left(\frac{1}{3}\times\frac{1}{3}\right)}-\frac{1}{9}$$

$$=\frac{\frac{1}{3}}{\frac{1}{3}\div\frac{1}{9}}-\frac{1}{9}=\frac{\frac{1}{3}}{\frac{1}{3}\times 9}-\frac{1}{9}$$

$$=\frac{1}{3}-\frac{1}{9}=\frac{1}{9}-\frac{1}{9}=0$$

29. (4) Using Rule 1,
The given expression

$$= \frac{\frac{11}{4}}{\frac{11}{6}} \div \frac{7}{8}\left(\frac{4+3}{12}\right) + \frac{5}{7} \div \frac{3}{4} \text{ of } \frac{3}{7}$$

$$= \left(\frac{11}{4} \times \frac{6}{11}\right) \div \frac{7}{8} \times \frac{7}{12} + \frac{5}{7} \div \left(\frac{3}{4} \times \frac{3}{7}\right)$$

$$= \frac{3}{2} \div \frac{7}{8} \times \frac{7}{12} + \frac{5}{7} \div \frac{9}{28}$$

$$= \frac{3}{2} \times \frac{8}{7} \times \frac{7}{12} + \frac{5}{7} \times \frac{28}{9}$$

$$= 1 + \frac{20}{9} = \frac{9+20}{9} = \frac{29}{9} = 3\frac{2}{9}$$

30. (4) $3.\overline{36} - 2.\overline{05} + 1.\overline{33}$

$$= 3\frac{36}{99} - 2\frac{05}{99} + 1\frac{33}{99}$$

$$= 3 + \frac{36}{99} - 2 - \frac{5}{99} + 1 + \frac{33}{99}$$

$$= (3 - 2 + 1) + \left(\frac{36}{99} - \frac{5}{99} + \frac{33}{99}\right)$$

$$= 2 + \left(\frac{36 - 5 + 33}{99}\right)$$

$$= 2 + \frac{64}{99} = 2\frac{64}{99} = 2.\overline{64}$$

31. (1) Using (x) of Basic Formulae
Let 0.9 = x, 0.2 = y and 0.3 = z
Then, the given expression

$$= \frac{x \times x \times x + y \times y \times y + z \times z \times z - 3 \times x \times y \times z}{x \times x + y \times y + z \times z - x \times y - y \times z - z \times x}$$

$$= \frac{x^3 + y^3 + z^3 - 3xyz}{x^2 + y^2 + z^2 - xy - yz - zx}$$

$$= \frac{(x + y + z)\left(x^2 + y^2 + z^2 - xy - yz - zx\right)}{x^2 + y^2 + z^2 - xy - yz - zx}$$

$= x + y + z$
$= 0.9 + 0.2 + 0.3 = 1.4$

32. (2) Using Rule 1,

$$\left(\frac{1}{9}\right)^2 \left\{1 - 9\left(\frac{16-1}{90}\right)^2\right\}$$

$$= \frac{1}{81}\left\{1 - \frac{9 \times 15 \times 15}{90 \times 90}\right\}$$

$$= \frac{1}{81} \times \left\{1 - \frac{1}{4}\right\}$$

$$= \frac{1}{81} \times \frac{3}{4} = \frac{1}{108}$$

33. (3) Using Rule 1,

$$\frac{\frac{3}{2}}{\frac{1}{2}} \div \frac{4}{7}\left(\frac{4+3}{10}\right) \text{ of } \frac{\frac{3+2}{6}}{\frac{3-2}{6}}$$

$$= 3 \div \frac{4}{7}\left(\frac{7}{10}\right) \text{ of } \left(\frac{5}{6} \times 6\right)$$

$$= 3 \div \left(\frac{4}{7} \times \frac{7}{10} \times 5\right) = 3 \div 2 = \frac{3}{2}$$

34. (3) Using Rule 1,
$[0.9 - \{2.3 - 3.2 - (7.1 - 8.9)\}]$
$= [0.9 - \{2.3 - 3.2 + 1.8\}]$
$= [0.9 - 0.9] = 0$

35. (2) Using (x) of Basic Formulae
Let, 32 = a
79 = b, –111 = c
When (a + b + c) = 0
then $a^3 + b^3 + c^3 - 3abc = 0$
Here, a+ b+c = 32+79–111 = 0
$\therefore (32)^3 + (79)^3 - (111)^3 + 3 \times 32 \times 79 \times 111 = 0$

36. (2) Using Rule 1,

$$\left(\frac{5}{2} + \frac{3}{2}\right)\left(\frac{25}{4} - \frac{15}{4} + \frac{9}{4}\right)$$

$$= 4 \times \frac{19}{4} = 19$$

37. (1) Expression $= \frac{(0.04 + 0.01)}{(0.01 + 0.02)}$

$$= \frac{0.05}{0.03} = \frac{5}{3}$$

38. (3) Using Rule 1,
Expression

$$= \frac{1}{2} + \left\{\frac{19}{4} - \left(\frac{19}{6} - \frac{7}{3}\right)\right\}$$

$$= \frac{1}{2} + \left\{\frac{19}{4} - \left(\frac{19-14}{6}\right)\right\}$$

$$= \frac{1}{2} + \left\{\frac{19}{4} - \frac{5}{6}\right\}$$

$$= \frac{1}{2} + \frac{19}{4} - \frac{5}{6}$$

$$= \frac{6 + 57 - 10}{12} = \frac{53}{12} = 4\frac{5}{12}$$

39. (1) Expression = 0.125 + 0.015625 + 0.001953125 + 0.00024414 + 0.000030517
$= 0.1428 \approx 0.143$

40. (3) Using Rule 1,
Expression
$= 8.7 - [7.6 - \{6.5 - (5.4 - \overline{4.3 - 2})\}]$
$= 8.7 - [7.6 - \{6.5 - (5.4 - 2.3)\}]$
$= 8.7 - [7.6 - \{6.5 - 3.1\}]$
$= 8.7 - [7.6 - 3.4]$
$= 8.7 - 4.2 = 4.5$

41. (2) Using (x) of Basic Formulae
If $a + b + c = 0$, then
$a^3 + b^3 + c^3 = 3abc$
Here, 0.111 + 0.222 + (–0.333) = 0
$\therefore (0.111)^3 + (0.222)^3 + (-0.333)^3$
$= -3 \times 0.111 \times 0.222 \times 0.333$
$= -(0.333)^2 \times 0.222$
$\therefore$ Expression
$= [-(0.333)^2 \times 0.222 + (0.333)^2 \times 0.222]^3 = 0$

42. (4) Using Rule 1,
Expression

$$= \frac{\frac{5}{4} \div \frac{3}{2}}{\left(\frac{2 + 30 - 27}{30}\right)}$$

$$= \frac{\frac{5}{4} \times \frac{2}{3}}{\frac{5}{30}} = \frac{5}{6} \times \frac{30}{5} = 5$$

43. (2) Using Rule 1,
Expression

$$= \frac{-30 - 40 + 48 - 20 + 12 + 45}{\frac{30 + 40 - 80 + 20 - 12 - 48}{60}}$$

$$= \frac{105 - 90}{90 - 140} = -\frac{15}{50} = -\frac{3}{10}$$

44. (2) Expression

$$= 0.\overline{63} + 0.\overline{37} + 0.\overline{80}$$

$$= \frac{63}{99} + \frac{37}{99} + \frac{80}{99}$$

$$= \frac{63 + 37 + 80}{99} = \frac{180}{99}$$

$$= 1\frac{81}{99} = 1.\overline{81}$$

45. (4) Let (4.53 – 3.07) = a
(3.07 – 2.15) = b and
(2.15 – 4.53) = c $\therefore$ $a + b + c = 0$
$\therefore$ Expression

$= \frac{a^2}{bc} + \frac{b^2}{ac} + \frac{c^2}{ab}$

$= \frac{a^3 + b^3 + c^3}{abc} = \frac{3\ abc}{abc} = 3$

[If $a + b + c = 0$, $a^3 + b^3 + c^3 = 3\ abc$]

46. (2) Using Rule 1,
Expression

$= \frac{17}{15} \times \frac{17}{15} + \frac{2}{15} \times \frac{2}{15} - 2 \times \frac{17}{15} \times \frac{2}{15}$

$= \left(\frac{17}{15} - \frac{2}{15}\right)^2$

$= \left(\frac{17-2}{15}\right)^2 = \left(\frac{15}{15}\right)^2 = 1$

47. (4) Using (v) of Basic Formulae

Let $4\frac{11}{15} = a$ and $\frac{15}{71} = b$.

$\therefore$ Expression
$= (a + b)^2 - (a - b)^2$
$= (a^2 + b^2 + 2ab) - (a^2 + b^2 - 2ab) = 4ab$

$= 4 \times 4\frac{11}{15} \times \frac{15}{71} = 4 \times \frac{71}{15} \times \frac{15}{71} = 4$

48. (2) Let $0.1 = a \Rightarrow 0.2 = 2a$
and $0.02 = b \Rightarrow 0.04 = 2b$
$\therefore$ Expression

$= \frac{a^3 + b^3}{8a^3 + 8b^3}$

$= \frac{a^3 + b^3}{8(a^3 + b^3)} = \frac{1}{8} = 0.125$

49. (1) $5\frac{3}{*} \times \frac{7}{2} = 19$

$\Rightarrow 5\frac{3}{*} = \frac{19 \times 2}{7}$

$\Rightarrow 5\frac{3}{*} = \frac{38}{7} = 5\frac{3}{7}$

$\Rightarrow * = 7$

50. (3) Using Rule 7,

$\left(\sqrt{2} + \frac{1}{\sqrt{2}}\right)^2$

$= 2 + \frac{1}{2} + 2 \times \sqrt{2} \times \frac{1}{\sqrt{2}} = 4\frac{1}{2}$

51. (4) Expression
$= (0.98)^3 + (0.02)^3 + 3 \times 0.98 \times 0.02 - 1$
$= (0.98)^3 + (0.02)^3 + 3 \times 0.98 \times 0.02\ (0.98+0.02) - 1$
$= (0.98 + 0.02)^3 - 1 = 1 - 1 = 0$

52. (3) Expression
$= 71 \times 29 + 27 \times 15 + 8 \times 4$
$= 2059 + 405 + 32 = 2496$

53. (2) Expression
$= 0.05 \times 5 - 0.005 \times 5$
$= 0.25 - 0.025 = 0.225$

54. (1) Let $0.2 = a$ and $0.04 = b$
$\Rightarrow 0.4 = 2a$ and $0.08 = 2b$
$\therefore$ Expression

$= \sqrt[3]{\frac{a \times a \times a + b \times b \times b}{2a \times 2a \times 2a + 2b \times 2b \times 2b}}$

$= \sqrt[3]{\frac{a^3 + b^3}{8(a^3 + b^3)}} = \sqrt[3]{\frac{1}{8}} = \frac{1}{2} = 0.5$

55. (1) Expression
$= (256)^{0.16} \times (16)^{0.18}$
$= (2^8)^{0.16} \times (2^4)^{0.18}$
$= (2)^{8 \times 0.16} \times (2)^{4 \times 0.18}$
$= (2)^{1.28} \times (2)^{0.72} = (2)^{1.28+0.72}$
$= (2)^2 = 4$

56. (4) Expression

$\left(\frac{1}{3.5} + \frac{1}{5.7} + \frac{1}{7.9} + \frac{1}{9.11} + \frac{1}{11.13} + \frac{1}{13.15}\right)$

$= \frac{1}{2}\left(\frac{2}{3.5} + \frac{2}{5.7} + \frac{2}{7.9} + \frac{2}{9.11} + \frac{2}{11.13} + \frac{2}{13.15}\right)$

$= \frac{1}{2}\left(\frac{1}{3} - \frac{1}{5} + \frac{1}{5} - \frac{1}{7} + \frac{1}{7} - \frac{1}{9} + \frac{1}{9} - \frac{1}{11} + \frac{1}{11} - \frac{1}{13} + \frac{1}{13} - \frac{1}{15}\right)$

$= \frac{1}{2}\left(\frac{1}{3} - \frac{1}{15}\right) = \frac{1}{2}\left(\frac{5-1}{15}\right)$

$= \frac{1}{2} \times \frac{4}{15} = \frac{2}{15}$

Aliter :
Using Rule 3,

$\frac{1}{3.5} + \frac{1}{5.7} + \frac{1}{7.9} + \frac{1}{9.11} + \frac{1}{11.13} + \frac{1}{13.15}$

Here, n = 3 and r = 6

$\Rightarrow \frac{1}{2}\left(\frac{1}{n} - \frac{1}{n + 2r}\right)$

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

$= \frac{1}{2}\left(\frac{1}{3} - \frac{1}{15}\right)$

$= \frac{1}{2}\left(\frac{5-1}{15}\right) = \frac{2}{15}$

57. (3) Expression
$= (53 \times 87 + 159 \times 21 + 106 \times 25)$
$= 53\ (87 + 3 \times 21 + 2 \times 25)$
$= 53\ (87 + 63 + 50)$
$= 53 \times 200 = 10600$

58. (4) Using Rule 4,
Expression

$= \frac{(0.5)^3 + (0.3)^3}{(0.5)^2 - 0.5 \times 0.3 + (0.3)^2}$

Let $0.5 = a$,and $0.3 = b$

$\therefore$ Expression $= \frac{a^3 + b^3}{a^2 - ab + b^2}$

$= \frac{(a + b)(a^2 - ab + b^2)}{a^2 - ab + b^2}$

$= a + b = 0.5 + 0.3 = 0.8$

59. (4) Using Rule 4,

Expression $= \frac{8(3.75)^3 + 1}{(7.5)^2 - 6.5}$

$= \frac{(2 \times 3.75)^3 + 1}{(7.5)^2 - 7.5 \times 1 + 1^2}$

$= \frac{(7.5)^3 + 1}{(7.5)^2 - 7.5 \times 1 + 1^2}$

$\left[a^3 + b^3 = (a + b)(a^2 - ab + b^2)\right]$

$= 7.5 + 1 = 8.5$

60. (2) Using Rule 6,
Let $2.697 = a$ and $0.498 = b$
$\therefore$ Expression

$= \frac{(a - b)^2 + (a + b)^2}{a^2 + b^2}$

$= \frac{2(a^2 + b^2)}{a^2 + b^2} = 2$

61. (1) Using Rule 1,
Expression

$= \frac{\frac{13}{4} - \frac{4}{5} \times \frac{5}{6}}{\frac{13}{3} \times 5 - \left(\frac{3}{10} + \frac{106}{5}\right)}$

$= \frac{\frac{13}{4} - \frac{2}{3}}{\frac{65}{3} - \frac{3}{10} - \frac{106}{5}}$

$= \frac{\frac{39-8}{12}}{\frac{650-9-636}{30}}$

$= \frac{31}{12} \times \frac{30}{5} = \frac{31}{2} = 15\frac{1}{2}$

$\therefore$ Required answer

$= 15\frac{1}{2} - 15 = \frac{1}{2}$

62. (2) $\sqrt[2]{0.014 \times 0.14x}$

$= 0.014 \times 0.14 \ \sqrt[2]{y}$

On squaring both sides,

$0.014 \times 0.14x$

$= (0.014)^2 \times (0.14)^2 \times y$

$\therefore \ \frac{x}{y} = 0.014 \times 0.14 = 0.00196$

63. (1)

$$\frac{4.41 \times 0.16}{2.1 \times 1.6 \times 0.21} = \frac{441 \times 16}{21 \times 16 \times 21} = 1$$

64. (4) $0.1 \times 0.01 \times 0.001 \times 10^7$

$= 10^{-6} \times 10^7 = 10$

65. (4) Expression

$$= \frac{3.20(3.25 - 3.05)}{0.064}$$

$$= \frac{3.20 \times 0.20}{0.064} = 10$$

66. (4) $\frac{0.01 - 0.0001}{0.0001} + 1 = \frac{0.0099}{0.0001} + 1$

$= 99 + 1 = 100$

67. (1) Expression

$= 0.5 \ (5 + 0.25 + 4 + 0.75)$

$= 0.5 \times 10 = 5$

68. (4) Using Rule 1,

Expression

$$= \frac{20 \div 5}{9 + 3 \div 3} = \frac{4}{10} = \frac{2}{5}$$

69. (3) Expression

$$= \frac{(100-1)(100-2)(100-3)\ldots}{(100-100)\ldots(100-200)}$$

$$= \frac{}{100 \times 99 \times 98 \times \ldots \times 3 \times 2 \times 1}$$

$= 0$ [$\because 100 - 100 = 0$]

70. (1) $(0.9)^3 + (0.1)^3$

$= 0.729 + 0.001 = 0.73$

71. (4) Using Rule 4,

Let $0.0347 = a$

and, $0.9653 = b$

$\therefore$ Expression $= \frac{a^3 + b^3}{a^2 - ab + b^2}$

$$= \frac{(a+b)\left(a^2 - ab + b^2\right)}{a^2 - ab + b^2} = a + b$$

$= 0.0347 + 0.9653 = 1$

72. (4) Using Rule 5,

Expression

$$= \frac{(3.2)^3 - (0.2)^3}{(3.2)^2 + 3.2 \times 0.2 + (0.2)^2}$$

Let $3.2 = a$ and $0.2 = b$

$\therefore$ Expression $= \frac{a^3 - b^3}{a^2 + ab + b^2}$

$$= \frac{(a-b)(a^2 + ab + b^2)}{a^2 + ab + b^2} = a - b$$

$= 3.2 - 0.2 = 3$

73. (1) Using Rule 1,

$$\text{Expression} = \frac{\frac{1}{3} + \frac{1}{4}\left[\frac{4-5}{10}\right]}{\frac{3}{4} \times \frac{5}{3} - \frac{4}{5} \times \frac{3}{4}}$$

$$= \frac{\frac{1}{3} - \frac{1}{4} \times \frac{1}{10}}{\frac{5}{4} - \frac{3}{5}} = \frac{\frac{1}{3} - \frac{1}{40}}{\frac{5}{4} - \frac{3}{5}} -$$

$$= \frac{\frac{40-3}{120}}{\frac{25-12}{20}} = \frac{37}{120} \times \frac{20}{13} = \frac{37}{78}$$

74. (2) Using Rule 1,

Expression

$$= \frac{0.04}{0.03} \times \frac{\left(\frac{10}{3} - \frac{5}{2}\right) \div \frac{5}{4} \times \frac{1}{2}}{\frac{1}{3} + \frac{1}{9} \times \frac{1}{5}}$$

$$= \frac{4}{3} \times \frac{\left(\frac{20-15}{6}\right) \div \frac{5}{8}}{\frac{1}{3} + \frac{1}{45}}$$

$$= \frac{4}{3} \times \frac{\frac{5}{6} \times \frac{8}{5}}{\frac{15+1}{45}} = \frac{4}{3} \times \frac{45}{16} \times \frac{4}{3} = 5$$

75. (3) Expression

$$= \frac{0.3555 \times 0.5555 \times 2.025}{0.225 \times 1.7775 \times 0.2222}$$

$$= \frac{3555 \times 5555 \times 2025}{225 \times 17775 \times 2222} = 4.5$$

76. (2) Using Rule 1,

$100 \times 10 - 100 + 2000 \div 100$

$= 100 \times 10 - 100 + 20$

$= 100 \ (10 - 1) + 20$

$= 100 \times 9 + 20$

$= 900 + 20 = 920$

77. (4) $\frac{547.527}{0.0082} = x$

$\Rightarrow \frac{5475270}{82} = x$

$\Rightarrow \frac{547527}{82} = \frac{x}{10}$

78. (3) $\frac{1}{1 + 2^{a-b}} + \frac{1}{1 + 2^{b-a}}$

$$= \frac{1}{1 + \frac{2^a}{2^b}} + \frac{1}{1 + \frac{2^b}{2^a}}$$

$$= \frac{2^b}{2^b + 2^a} + \frac{2^a}{2^a + 2^b} = \frac{2^b + 2^a}{2^b + 2^a} = 1$$

79. (1) Using Rule 1,

Expression

$$= \frac{7}{2} - \left[\frac{9}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{3}{2} - \frac{1}{3} - \frac{1}{6}\right)\right\}\right]$$

$$= \frac{7}{2} - \left[\frac{9}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{9-2-1}{6}\right)\right\}\right]$$

$$= \frac{7}{2} - \left[\frac{9}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\right\}\right]$$

$$= \frac{7}{2} - \left[\frac{9}{4} \div \left\{\frac{5-2}{4}\right\}\right]$$

$$= \frac{7}{2} - \left[\frac{9}{4} \div \frac{3}{4}\right]$$

$$= \frac{7}{2} - \frac{9}{4} \times \frac{4}{3}$$

$$= \frac{7}{2} - 3 = \frac{7-6}{2} = \frac{1}{2}$$

80. (2) Using Rule 7,

Let $3\frac{3}{5} = a$ and $\frac{2}{5} = b$, then

Expression $= a^2 + 2ab + b^2$

$= (a + b)^2$

$$= \left(3\frac{3}{5} + \frac{2}{5}\right)^2 = (4)^2 = 16$$

81. (2)

$$\left(1 - \frac{1}{n+1}\right) + \left(1 - \frac{2}{n+1}\right) + \left(1 - \frac{3}{n+1}\right) + \ldots\ldots \left(1 - \frac{n}{n+1}\right)$$

$$= n - \left(\frac{1}{n+1} + \frac{2}{n+1} + \frac{3}{n+1} + \ldots + \frac{n}{n+1}\right)$$

$$= n - \frac{1 + 2 + 3 + \ldots\ldots + n}{n+1}$$

$$= n - \frac{n(n+1)}{2(n+1)} = n - \frac{n}{2} = \frac{n}{2} = \frac{1}{2}n$$

82. (1) Using Rule 1,
Expression

$$= \frac{16}{3} \div \frac{11}{9} \times \frac{1}{4}\left(10 + \frac{3}{\frac{5-1}{5}}\right)$$

$$= \frac{16}{3} \times \frac{9}{11} \times \frac{1}{4}\left(10 + \frac{15}{4}\right)$$

$$= \frac{16}{3} \times \frac{9}{11} \times \frac{1}{4}\left(\frac{40+15}{4}\right)$$

$$= \frac{16}{3} \times \frac{9}{11} \times \frac{1}{4} \times \frac{55}{4} = 15$$

83. (2) Using Rule 1,
$x[-2\{-4(-a)\}] + 5[-2\{-2(-a)\}] = 4a$
$\Rightarrow x \times (-8a) + 5 \times (-4a) = 4a$
$\Rightarrow x \times (-2) + 5 \times (-1) = 1$
$\Rightarrow 2x + 5 = -1$
$\Rightarrow 2x = -5 - 1 = -6$

$$\Rightarrow x = \frac{-6}{2} = -3$$

84. (*) Using Rule 1,
Expression

$$= 3 \div \left[(8-5) \div \left\{(4-2) + \left(2 + \frac{8}{13}\right)\right\}\right]$$

$$= 3 \div \left[3 \div \left\{2 + \frac{26+8}{13}\right\}\right]$$

$$= 3 \div \left[3 \div \left\{2 + \frac{34}{13}\right\}\right]$$

$$= 3 \div \left[3 \div \left\{\frac{26+34}{13}\right\}\right]$$

$$= 3 \div \left[3 \div \frac{60}{13}\right]$$

$$= 3 \div \left[\frac{3 \times 13}{60}\right]$$

$$= 3 \div \frac{13}{20} = 3 \times \frac{20}{13} = \frac{60}{13}$$

85. (4) Using Rule 1,
$? = 9 + 3 \div 4 - 8 \times 2$
After respective substitutions,
$? = 9 \div 3 \times 4 + 8 - 2$

$$= \frac{9}{3} \times 4 + 8 - 2$$

$= 20 - 2 = 18$

86. (1) Using Rule 1,
Expression

$$= \frac{4}{15} \text{ of } \frac{5}{8} \times 6 + 15 - 10$$

$= 1 + 15 - 10 = 16 - 10 = 6$

87. (4) Expression

$$= \frac{0.2 \times 0.02 \times 0.002 \times 32}{0.4 \times 0.04 \times 0.004 \times 16}$$

$$= \frac{32}{2 \times 2 \times 2 \times 16} = \frac{1}{4} = 0.25$$

88. (4) $a^2 + b^2 + c^2 - ab - bc - ac$

$$= \frac{1}{2}(2a^2 + 2b^2 + 2c^2 - 2ab - 2bc - 2ac)$$

$$= \frac{1}{2}[(a-b)^2 + (b-c)^2 + (c-a)^2]$$

$$= \frac{1}{2}[(113-115)^2 + (115-117)^2 + (117-113)^2]$$

Where, $a = 113$, $b = 115$, $c = 117$.

$$= \frac{1}{2}[(-2)^2 + (-2)^2 + 4^2]$$

$$= \frac{1}{2}(4 + 4 + 16)$$

$$= \frac{1}{2} \times 24 = 12$$

TYPE-III

1. (3) $\sqrt{1.3} + \sqrt{1300} + \sqrt{0.013}$

$$= \sqrt{\frac{130}{100}} + 10\sqrt{13} + \sqrt{\frac{130}{10000}}$$

$$= \frac{1}{10}\sqrt{130} + 10\sqrt{13} + \frac{1}{100}\sqrt{130}$$

$$= \frac{11.40}{10} + 3.605 \times 10 + \frac{11.40}{100}$$

$= 1.140 + 36.05 + 0.1140$
$= 37.304$

2. (3) $? = \dfrac{(2.644)^2 - (2.356)^2}{0.288}$

$$= \frac{(2.644 - 2.356)(2.644 + 2.356)}{0.288}$$

$$= \frac{0.288 \times 5}{0.288} = 5$$

Aliter :
Using Rule 8,

$$\frac{(2.644)^2 - (2.356)^2}{0.288}$$

$$= \frac{(2.644)^2 - (2.356)^2}{(2.644 - 2.356}$$

$= (2.\ 644 + 2.356) = 5$

3. (1)

$$? = \frac{(3.4567 + 3.4533)(3.4567 - 3.4533)}{0.0034}$$

$$= \frac{6.9100 \times 0.0034}{0.0034} = 6.91$$

Aliter :
Using Rule 8,

$$\frac{(3.4567 + 3.4533)(3.4567 - 3.4533)}{0.0034}$$

$$= \frac{3.4567^2 - 3.4533^2}{(3.4567 - 3.4533)}$$

$= 3.4567 + 3.4533 = 6.91$

4. (4) $\dfrac{(0.03)^2 - (0.01)^2}{0.03 - 0.01}$

[Using $a^2 - b^2 = (a + b)(a - b)$]

$$= \frac{(0.03 + 0.01)(0.03 - 0.01)}{0.03 - 0.01}$$

$= 0.03 + 0.01 = 0.04$

Aliter :
Using Rule 8,

$$\frac{(0.03)^2 - (0.01)^2}{0.03 - 0.01}$$

$= (0.03 + 0.01 = 0.04$

5. (4) $\left(\sqrt{72} - \sqrt{18}\right) \div \sqrt{12}$

$$= \frac{\sqrt{72} - \sqrt{18}}{\sqrt{12}}$$

$$= \frac{6\sqrt{2} - 3\sqrt{2}}{2\sqrt{3}} = \frac{3\sqrt{2}}{2\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{6}}{2}$$

6. (3) $\dfrac{\sqrt{80} - \sqrt{112}}{\sqrt{45} - \sqrt{63}}$

$$= \frac{\sqrt{16 \times 5} - \sqrt{16 \times 7}}{\sqrt{9 \times 5} - \sqrt{9 \times 7}}$$

$$= \frac{4\sqrt{5} - 4\sqrt{7}}{3\sqrt{5} - 3\sqrt{7}} = \frac{4\left(\sqrt{5} - \sqrt{7}\right)}{3\left(\sqrt{5} - \sqrt{7}\right)}$$

$$= \frac{4}{3} = 1\frac{1}{3}$$

7. (2)

$$\sqrt{\frac{(0.1)^2+(0.01)^2+(0.009)^2}{(0.01)^2+(0.001)^2+(0.0009)^2}}$$

$$=\sqrt{\frac{0.01+0.0001+0.000081}{0.0001+0.000001+0.00000081}}$$

$$=\sqrt{\frac{0.010181}{0.00010181}}=\sqrt{100}=10$$

8. (2) Let $0.03 = x \Rightarrow 0.003 = \frac{x}{10}$

$0.21 = y \Rightarrow 0.021 = \frac{y}{10}$

and $0.065 = z \Rightarrow 0.0065 = \frac{z}{10}$

$\therefore$ Expression

$$=\sqrt{\frac{x^2+y^2+z^2}{\left(\frac{x}{10}\right)^2+\left(\frac{y}{10}\right)^2+\left(\frac{z}{10}\right)^2}}$$

$$=\sqrt{100\frac{\left(x^2+y^2+z^2\right)}{\left(x^2+y^2+z^2\right)}}$$

$$=\sqrt{100}=10$$

9. (2)

$\sqrt{0.01}+\sqrt{0.81}+\sqrt{1.21}+\sqrt{0.0009}$

$= 0.1 + 0.9 + 1.1 + 0.03$

$= 2.13$

10. (3) $\sqrt{\frac{(6.1)^2+(61.1)^2+(611.1)^2}{(0.61)^2+(6.11)^2+(61.11)^2}}$

$$=\sqrt{\frac{(10\times0.61)^2+(10\times6.11)^2+(10\times61.11)^2}{(0.61)^2+(6.11)^2+(61.11)^2}}$$

$$=\sqrt{100}=10$$

11. (4) $\sqrt{\frac{20.2\times4}{0.25\times20.2}}=\sqrt{\frac{4}{0.25}}$

$$=\sqrt{\frac{400}{25}}=\sqrt{16}=4$$

12. (2) Using Rule 4,

Let $0.051 = x$ and $0.041 = y$

$\therefore$ The given expression

$$=\frac{x^3+y^3}{x^2-xy+y^2}$$

$$=\frac{(x+y)\left(x^2-xy+y^2\right)}{x^2-xy+y^2}$$

$= x + y = 0.051 + 0.041$

$= 0.092$

13. (1) $\sqrt{5+\sqrt{11+\sqrt{19+\sqrt{29+7}}}}$

$$=\sqrt{5+\sqrt{11+\sqrt{19+6}}}$$

$$=\sqrt{5+\sqrt{11+\sqrt{25}}}$$

$$=\sqrt{5+\sqrt{11+5}}=\sqrt{5+4}$$

$$=\sqrt{9}=3$$

14. (4) $\frac{(75\cdot8)^2-(55\cdot8)^2}{20}$

$$=\frac{(75\cdot8-55\cdot8)(75\cdot8+55\cdot8)}{20}$$

$$=\frac{20\times131\cdot6}{20}=131\cdot6$$

Aliter :

Using Rule 8,

$$\frac{(75.8)^2-(55.8)^2}{(75.8-55.8)}$$

$= 75.8 + 55.8 = 131.6$

15. (4) Expression

$$=\sqrt{\frac{(0.25\times0.09)}{0.0009\times0.36}}$$

$$=\sqrt{\frac{\frac{25}{100}\times\frac{9}{100}}{\frac{9}{10000}\times\frac{36}{100}}}$$

$$=\sqrt{\frac{25\times9\times1000000}{9\times36\times10000}}$$

$$=\frac{5\times10}{6}=\frac{25}{3}=8\frac{1}{3}$$

16. (4) Using Rule 8,

Let $3.63 = a$ and $2.37 = b$

$\therefore$ Expression $= \frac{a^2-b^2}{a+b}$

$$=\frac{(a-b)(a+b)}{a+b}$$

$= a - b = 3.63 - 2.37 = 1.26$

17. (4) Expression

$$=\sqrt{\frac{0.081\times0.484}{0.0064\times6.25}}$$

$$=\sqrt{\frac{81\times484}{64\times625}}=\frac{9\times22}{8\times25}=0.99$$

18. (2) Expression

$= \sqrt{900}+\sqrt{0.09}-\sqrt{0.000009}$

$= 30 + 0.3 - 0.003$

$= 30.297$

19. (2) Expression

$$=\sqrt{\frac{0.009\times0.036\times0.016\times0.08}{0.002\times0.0008\times0.0002}}$$

$$=\sqrt{\frac{9\times36\times16\times8}{2\times8\times2}}$$

$= 3 \times 2 \times 3 \times 2 = 36$

20. (2) Expression

$$=\sqrt{\frac{5}{4}\times\frac{64}{125}\times1.44}$$

$$=\sqrt{\frac{16}{25}\times\frac{144}{100}}=\frac{4}{5}\times\frac{12}{10}=\frac{24}{25}$$

21. (1) Expression

$$=2\sqrt{54}-6\sqrt{\frac{2}{3}}-\sqrt{96}$$

$$=2\sqrt{9\times6}-\sqrt{\frac{2\times6\times6}{3}}-\sqrt{16\times6}$$

$= 2\times3\sqrt{6}-2\sqrt{6}-4\sqrt{6} = 0$

22. (4) $\frac{\sqrt{24}+\sqrt{216}}{\sqrt{96}}=\frac{2\sqrt{6}+6\sqrt{6}}{4\sqrt{6}}$

$$=\frac{8\sqrt{6}}{4\sqrt{6}}=2$$

23. (2) $\frac{4-\sqrt{0.04}}{4+\sqrt{0.4}}=\frac{4-0.2}{4+\sqrt{0.4}}$

$$=\frac{3.8}{4+0.632}=\frac{3.8}{4.632}=0.8$$

$= (a + b) = 0.08 + 0.02 = 0.1$

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

(Rationalising the denominator)

$$=\frac{3+\sqrt{8}}{9-8}=3+\sqrt{8}$$

$\therefore$ Expression

$= 3+\sqrt{8}+3+\sqrt{8}-6-4\sqrt{2}$

$= 6+2\sqrt{8}-6-4\sqrt{2}=2\sqrt{8}-4\sqrt{2}$

$= 2\times2\sqrt{2}-4\sqrt{2}=0$

25. (1) $\sqrt{0.09} = \sqrt{0.3 \times 0.3} = 0.3$

26. (3) Expression

$$= \frac{(0.75)^3 + (1-0.75)\left((0.75)^2 + 0.75 \times 1 + 1^2\right)}{1-0.075}$$

$$= \frac{(0.75)^3 + 1^3 - (0.75)^3}{0.25}$$

$$= \frac{1}{0.25} = \frac{100}{25} = 4$$

$\therefore$ Required square root

$= \sqrt{4} = 2$

27. (3) $? = \sqrt{\left(272^2 - 128^2\right)}$

$$= \sqrt{(272+128)(272-128)}$$

$$= \sqrt{400 \times 144} = 20 \times 12 = 240$$

28. (3) $\sqrt{0.000441}$

$= \sqrt{0.021 \times 0.021}$

$= 0.021$

29. (2) Expression $= \frac{\sqrt{0.441}}{\sqrt{0.625}}$

$$= \sqrt{\frac{0.441}{0.625}} = \sqrt{\frac{441}{625}}$$

$$= \frac{21}{25} = 0.84$$

30. (3) $\sqrt{\frac{0.342 \times 0.684}{0.000342 \times 0.000171}}$

$$= \sqrt{\frac{342 \times 684 \times 10^6}{342 \times 171}}$$

$$= \sqrt{4 \times 10^6} = 2 \times 10^3 = 2000$$

31. (1) $\sqrt{0.00060516} = 0.0246$

32. (3) $= \sqrt{\frac{9.5 \times 0.085}{0.017 \times 0.019}} = \sqrt{2500}$

$= 50$

33. (2) $\sqrt{248 + \sqrt{52 + \sqrt{144}}}$

$$= \sqrt{248 + \sqrt{52+12}}$$

$$= \sqrt{248 + \sqrt{64}} = \sqrt{248+8}$$

$\sqrt{256} = \pm 16$

34. (4) $\because (102)^2 = 10404$

$\Rightarrow \sqrt{10404} = 102$

$\sqrt{104.04} + \sqrt{1.0404} + \sqrt{0.010404}$

$= 10.2 + 1.02 + 0.102$

$= 11.322$

35. (2) $\sqrt{0.00004761} = \sqrt{\frac{4761}{10^8}}$

$$= \sqrt{\frac{3 \times 3 \times 23 \times 23}{10^4 \times 10^4}}$$

$$= \frac{69}{10^4} = 0.0069$$

36. (1) $\sqrt{2} = 1.414$ (Given)

Now,

$$\frac{\sqrt{2}-1}{\sqrt{2}+1} = \frac{\left(\sqrt{2}-1\right)\left(\sqrt{2}-1\right)}{\left(\sqrt{2}+1\right)\left(\sqrt{2}-1\right)}$$

$$= \frac{\left(\sqrt{2}-1\right)^2}{2-1} = \left(\sqrt{2}-1\right)^2$$

$= 2 + 1 - 2\sqrt{2}$

$= 3 - 2\sqrt{2}$

$= 3 - 2 \times 1.44$

$= 3 - 2.828$

$= 0.172$

37. (2) $\sqrt{\frac{0.00001225}{0.00005329}}$

$$= \sqrt{\frac{\frac{1225}{10^8}}{\frac{5329}{10^8}}} = \sqrt{\frac{1225}{5329}} = \frac{35}{73}$$

38. (2) $0.\overline{4} = \frac{4}{9}$

$$\therefore \sqrt{\frac{4}{9}} = \frac{2}{3} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9} = 0.\overline{6}$$

39. (2) Given expression

$$= \frac{\left(3\frac{1}{4}\right)^4 - \left(4\frac{1}{3}\right)^4}{\left(3\frac{1}{4}\right)^2 - \left(4\frac{1}{3}\right)^2}$$

$$= \frac{\left[\left(3\frac{1}{4}\right)^2 + \left(4\frac{1}{3}\right)^2\right]\left[\left(3\frac{1}{4}\right)^2 - \left(4\frac{1}{3}\right)^2\right]}{\left(3\frac{1}{4}\right)^2 - \left(4\frac{1}{3}\right)^2}$$

$$\left[\because a^2 - b^2 = (a+b)(a-b)\right]$$

$$= \left(3\frac{1}{4}\right)^2 + \left(4\frac{1}{3}\right)^2 = \left(\frac{13}{4}\right)^2 + \left(\frac{13}{3}\right)^2$$

$$= \frac{169}{16} + \frac{169}{9} = 169\left(\frac{1}{16} + \frac{1}{9}\right)$$

$$= 169\left(\frac{9+16}{144}\right) = \frac{169 \times 25}{144}$$

$\therefore$ Required answer

$$= \sqrt{\frac{169 \times 25}{144}} = \frac{13 \times 5}{12} = \frac{65}{12} = 5\frac{5}{12}$$

40. (2) Expression $= 0.6 \times 0.6 \times 0.6 + 0.4 \times 0.4 \times 0.4 + 3 \times 0.6 \times 0.4 (0.6 + 0.4) = (0.6+0.4)^3 = 1$

$\therefore$ Required square root $= 1$

41. (2) $\sqrt{\frac{0.49}{0.25}} + \sqrt{\frac{0.81}{0.36}}$

$$= \frac{0.7}{0.5} + \frac{0.9}{0.6} = \frac{42+45}{30} = \frac{87}{30}$$

$$= \frac{29}{10} = 2\frac{9}{10}$$

42. (4) $\sqrt{x} \div \sqrt{441} = 0.02$

$\Rightarrow \sqrt{x} = 0.02 \times 21$

$\Rightarrow x = 0.1764$

43. (3) $? = \sqrt{4 + \sqrt{44 + 100}}$

$= \sqrt{4 + \sqrt{144}} = \sqrt{4+12} = 4$

44. (4) $\sqrt{0.00005746} = \sqrt{5746 \times 10^{-8}}$

$= 75.8 \times 10^{-4} = 0.00758$

45. (2)

$$\sqrt{(0.798)^2 + 0.404 \times 0.798 + (0.202)^2} + 1$$

$$= \sqrt{(0.798)^2 + 2 \times 0.798 \times 0.202 + (0.202)^2} + 1$$

$$= \sqrt{(0.798+0.202)^2} + 1$$

$$= \sqrt{(1.000)^2} + 1 = 1 + 1 = 2$$

46. (3) $\sqrt{11.981 + 7\sqrt{1.2996}}$

$$= \sqrt{11.981 + 7 \times 1.14}$$

$$= \sqrt{11.981 + 7.98}$$

$$= \sqrt{19.961}$$

$= 4.467 \approx 4.5$

47. (3) Expression

$= 4\sqrt{2} - 8\sqrt{2} + 5\sqrt{2}$

$= \sqrt{2}(4 - 8 + 5) = \sqrt{2}$

$= 1.414$

48. (4)

$$(7 + 3\sqrt{5})(7 - 3\sqrt{5}) = (7)^2 - \left(3\sqrt{5}\right)^2$$

$= 49 - 45 = 4$

$\therefore$ Required square root

$= \sqrt{4} = 2$

49. (3) Expression
$= \sqrt{400} + \sqrt{0.0400} + \sqrt{0.000004}$
$= 20 + 0.2 + 0.002$
$= 20.202$

50. (3) Expression
$= \sqrt{192} - \frac{1}{2}\sqrt{48} - \sqrt{75}$
$= \sqrt{64 \times 3} - \frac{1}{2}\sqrt{16 \times 3} - \sqrt{25 \times 3}$
$= 8\sqrt{3} - \frac{1}{2} \times 4\sqrt{3} - 5\sqrt{3}$
$= 8\sqrt{3} - 2\sqrt{3} - 5\sqrt{3}$
$= \sqrt{3} = 1.7321$

51. (3) $\sqrt{\frac{48.4}{0.289}} = \sqrt{\frac{484}{2.89}}$
$= \frac{22}{1.7} = \frac{220}{17} = 12\frac{16}{17}$

52. (2) $10^2 + 11^2 + 12^2$
$= 100 + 121 + 144 = 365$
$\therefore$ Required sum = 10+11+12= 33

53. (3) $\sqrt{4096} = 64$
$\therefore \sqrt{40.96} = 6.4$ and
$\sqrt{0.4096} = 0.64$ etc.
$\therefore$ Expression
$= 6.4 + 0.64 + 0.064 + 0.0064$
$= 7.1104$

54. (2) $\sqrt{13} = 3.6$ and $\sqrt{130} = 11.4$
$\therefore \sqrt{1.3} + \sqrt{1300} + \sqrt{0.013}$
$= \sqrt{\frac{130}{100}} + \sqrt{13 \times 100} + \sqrt{\frac{130}{10000}}$
$= \frac{11.4}{10} + 3.6 \times 10 + \frac{11.4}{100}$
$= 1.14 + 36 + 0.114$
$= 37.254$

55. (1) Expression
$= \sqrt{5 + \sqrt{11 + \sqrt{19 + \sqrt{29 + 7}}}}$
$= \sqrt{5 + \sqrt{11 + \sqrt{19 + 6}}}$
$= \sqrt{5 + \sqrt{11 + 5}}$
$= \sqrt{5 + 4} = \sqrt{9} = 3$

56. (4) $\sqrt{110\frac{1}{4}} = \sqrt{\frac{441}{4}} = \sqrt{\frac{21 \times 21}{2 \times 2}}$
$= \frac{21}{2} = 10\frac{1}{2} = 10.5$

57. (1) Expression
$= \sqrt{8 + \sqrt{57 + \sqrt{38 + \sqrt{108 + \sqrt{169}}}}}$
$= \sqrt{8 + \sqrt{57 + \sqrt{38 + \sqrt{108 + 13}}}}$
$= \sqrt{8 + \sqrt{57 + \sqrt{38 + \sqrt{121}}}}$
$= \sqrt{8 + \sqrt{57 + \sqrt{38 + 11}}}$
$= \sqrt{8 + \sqrt{57 + \sqrt{49}}}$
$= \sqrt{8 + \sqrt{57 + 7}} = \sqrt{8 + \sqrt{64}}$
$= \sqrt{8 + 8} = \sqrt{16} = 4$

58. (3) $(10.15)^2 = 103.0225$
$\Rightarrow (1.015)^2 = 1.030225$
and $(101.5)^2 = 10302.25$
$\therefore \sqrt{1.030225} + \sqrt{10302.25}$
$= \sqrt{(1.015)^2} + \sqrt{(101.5)^2}$
$= 1.015 + 101.5$
$= 102.515$

59. (3) The number of digits in 625686734489 is 12.
$\therefore$ Number of digits in its square root = 6
i.e., $\sqrt{625686734489} = 791003.625$

60. (2) $\sqrt{841} = 29$
$\frac{\sqrt{841}}{10000} = \frac{29}{10000}$
$\Rightarrow \frac{\sqrt{841}}{100000000} = \frac{29}{10000}$
$\therefore \sqrt{0.00000841} = 0.0029$

61. (3) Expression
$= \sqrt{\frac{0.324 \times 0.081 \times 4.624}{1.5625 \times 0.0289 \times 72.9 \times 64}}$
$= \sqrt{\frac{324 \times 81 \times 4624}{15625 \times 289 \times 729 \times 64}}$
$= \frac{18 \times 9 \times 68}{125 \times 17 \times 27 \times 8} = 0.024$

62. (3) $\sqrt{0.25 \times 2.25} = 0.5 \times 1.5$
$= 0.75$

63. (2) $\sqrt{64} - \sqrt{36} = 8 - 6 = 2$

64. (2) $\sqrt{18225} = 135$
$\therefore \sqrt{182.25} = 13.5$;
$\sqrt{1.8225} = 1.35$;
$\sqrt{0.018225} = 0.135$
$\therefore$ Expression
$= 135 + 13.5 + 1.35 + 0.135$
$= 149.985$

65. (2) $21\frac{51}{169} = \frac{21 \times 169 + 51}{169}$
$= \frac{3600}{169}$
$\therefore \sqrt{21\frac{51}{169}} = \sqrt{\frac{3600}{169}} = \frac{60}{13} = 4\frac{8}{13}$

66. (2) $(1101)^2 = 1212201$
$\Rightarrow 1101 = \sqrt{1212201}$
$= \sqrt{121.2201}$
$\Rightarrow \sqrt{\frac{121.2201}{10000}} = \frac{1101}{100} = 11.01$

67. (1) Expression
$= \sqrt{\frac{0.064 \times 0.256 \times 15.625}{0.025 \times 0.625 \times 4.096}}$
$= \sqrt{\frac{64 \times 256 \times 15625}{25 \times 625 \times 4096}}$
$= \frac{8 \times 16 \times 125}{5 \times 25 \times 64} = 2$

68. (3)
$\sqrt{19.36} + \sqrt{0.1936} + \sqrt{0.001936}$
$+ \sqrt{0.00001936}$
$= 4.4 + 0.44 + 0.044 + 0.0044$
$= 4.8884$

69. (2) Let the numbers be x and y where $x > y$
$\therefore x^2 - y^2 = 45$
$\Rightarrow (x + y)(x - y) = 45$
Now, $45 = 5 \times 9$
$= 15 \times 3 = 45 \times 1$
$\therefore$ Number of pairs = 3

70. (3) Expression $= \frac{\sqrt{24} + \sqrt{216}}{\sqrt{96}}$
$= \frac{2\sqrt{6} + 6\sqrt{6}}{4\sqrt{6}} = \frac{8\sqrt{6}}{4\sqrt{6}} = 2$

71. (4) Expression

$$= \sqrt{3\frac{33}{64}} \div \sqrt{9\frac{1}{7}} \times 2\sqrt{3\frac{1}{9}}$$

$$= \sqrt{\frac{225}{64}} \div \sqrt{\frac{64}{7}} \times 2\sqrt{\frac{28}{9}}$$

$$= \sqrt{\frac{225}{64} \times \frac{7}{64} \times \frac{28}{9}} \times 2$$

$$= \frac{5 \times 7}{8 \times 4} \times 2 = \frac{35}{16} = 2\frac{3}{16}$$

72. (2) Expression

$$= \frac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}}$$

$$= \frac{4\sqrt{2} + 4\sqrt{3}}{2\sqrt{2} + 2\sqrt{3}} = \frac{4\left(\sqrt{2} + \sqrt{3}\right)}{2\left(\sqrt{2} + \sqrt{3}\right)} = 2$$

73. (1) Number of digits in 62478078 = 8
$\therefore$ Number of digits in its square root = 4

$\Rightarrow \sqrt{62478078} \approx 7904$

$\Rightarrow \sqrt{62473216} = 7904$

74. (4) For $n^r - tn + \frac{1}{4}$ to be a perfect square,
$r = 2$ and $t = \pm 1$

$$\left[n^2 - n + \frac{1}{4} = n^2 - 2.n.\frac{1}{2} + \frac{1}{4}\right.$$

$$\left. = \left(n - \frac{1}{2}\right)^2\right]$$

$$n^2 + n + \frac{1}{4} = n^2 + 2.n.\frac{1}{2} + \frac{1}{4}$$

$$= \left(n + \frac{1}{2}\right)^2$$

75. (4) $33 - 4\sqrt{35}$

$= 33 - 2 \times 2\sqrt{5 \times 7}$

$= 33 - 2 \times 2\sqrt{7} \times \sqrt{5}$

$= 28 + 5 - 2 \times 2\sqrt{7} \times \sqrt{5}$

$= \left(2\sqrt{7}\right)^2 + \left(\sqrt{5}\right)^2 - 2 \times 2\sqrt{7} \times \sqrt{5}$

$= \left(2\sqrt{7} - \sqrt{5}\right)^2$

$\therefore \sqrt{33 - 4\sqrt{35}}$

$= \sqrt{\left(2\sqrt{7} - \sqrt{5}\right)^2}$

$= \pm\left(2\sqrt{7} - \sqrt{5}\right)$

76. (3) Expression

$= \sqrt{156.25} + \sqrt{0.0081} - \sqrt{0.0361}$

$= 12.5 + 0.09 - 0.19 = 12.4$

77. (4) $\sqrt{24010000} = 4900$

Again, $\sqrt{4900} = 70$

$\therefore \sqrt[4]{24010000} = 70$

78. (2) $\sqrt{15876} = 126$
The digit at the unit's place is 6.

1	1 $\overline{58}$ $\overline{76}$	126
1	1	
22	58	
2	44	
246	1476	
6	1476	
252	×	

79. (1) Unit's digit in $(1570)^2 = 0$
Unit's digit in $(1571)^2 = 1$
Unit's digit in $(1572)^2 = 4$
Unit's digit in $(1573)^2 = 9$
$\therefore$ Required unit's digit
= Unit's digit in $(0 + 1 + 4 + 9) = 4$

80. (3) The smallest 4-digit number = 1000
The smallest 4 digit perfect square number = $2^{10} = 1024$

81. (1)

8	$\overline{68}$ $\overline{06}$ $\overline{21}$	824
8	64	
162	406	
2	324	
1644	8221	
	6576	
	1645	

$\therefore (824)^2 < 680621 < (825)^2$
$\therefore$ Required number
$= [(825)^2 - 680621] = 4$

82. (4) $392 = 2 \times 2 \times 2 \times 7 \times 7$
$= 2^2 \times 7^2 \times 2$
Clearly, when 392 is multiplied by 2, the product is a perfect square.

83. (3) $47 \times 47 = 2209$
Clearly, 6 should be added to 2203 to get a perfect square.

84. (4) Perfect square numbers between 50 and 1000 start from 64 to 961 i.e., $(8)^2$ to $(31)^2$
$\therefore$ The required number
$= (31 - 8) + 1 = 24$

85. (2)

9	$\overline{89}$ $\overline{58}$	94
9	81	
184	× 858	
4	736	
188	122	

Now, $95 \times 95 = 9025$
$\therefore$ Required number
$= 9025 - 8958 = 67$

86. (3) Largest 5-digit number = 99999
Now,

3	9 $\overline{99}$ $\overline{99}$	316
3	9	
61	× 99	
1	62	
626	3799	
6	3756	
632	× 43	

$\therefore$ Required number
$= 99999 - 43 = 99856$

87. (3) $11^2 = 121$, $12^2 = 144$,
$13^2 = 169$, $14^2 = 196$
$15^2 = 225$, $16^2 = 256$,
$17^2 = 289$
So, total perfect squares = 7

88. (3) $31^2 = 961$
$32^2 = 1024$
$\therefore$ Required number
$= 1000 - 961 = 39$

89. (3) $(31)^2 < 1000 < 32^2$
$32 \times 32 = 1024$
$\therefore$ Required number
$= 1024 - 1000 = 24$

90. (3) $99 \times 99 = 9801$

91. (1) $a^2 - 2ab + b^2 = (a - b)^2$
$\therefore 16a^2 - 12a$

$= (4a)^2 - 2 \times 4a \times \frac{3}{2}$

Hence, on adding $\left(\frac{3}{2}\right)^2 = \frac{9}{4}$, expression will be a perfect square.

92. (3) $p = q + 5$
$\Rightarrow p - q = 5$
$p^2 + q^2 = 55$
$\therefore (p - q)^2 + 2pq = 55$
$\Rightarrow 25 + 2pq = 55$
$\Rightarrow 2pq = 30$
$\Rightarrow pq = 15$

93. (3) Since the numbers between –10 and 10 will be single digit and the numbers below 100 will be either one digit or two digit. We know that the square root of one or two digit number is always single digit number. Therefore, required answer is option (3).

94. (1) Let the two numbers be A and B.
Then, A + B = 22
and $A^2 + B^2 = 404$
We know that
$(A + B)^2 = A^2 + B^2 + 2AB$
or $(22)^2 = 404 + 2AB$
or 484 = 404 + 2 AB
or 2AB = 80
or AB = 40
∴ The product of the two numbers = 40

95. (4) According to question,

$$\frac{1}{3} \times \sqrt{x} = 0.001$$

$$\Rightarrow \sqrt{x} = 0.003 \Rightarrow x = 0.000009$$

96. (3) Let the number be x
According to the question

$$\frac{3}{5} \text{ of } x^2 = 126.15$$

$$\Rightarrow x^2 = \frac{126.15 \times 5}{3}$$

$$\Rightarrow x^2 = 210.25$$

$$\therefore x = \sqrt{210.25} = 14.5$$

97. (1) Multiples of 11 whose square root are whole number
First = 11 × 11 = 121
Second = 11 × 11 × 4 = 484

98. (3) Let the number be *x*. Then,
$x^2 = (75.15)^2 - (60.12)^2$
= (75.15 + 60.12) (75.15 – 60.12)
= 135.27 × 15.03
= 2033.1081

$$\Rightarrow x = \sqrt{2033.1081}$$

= 45.09

99. (2) Let the required number be *x*. Then,
$x^2 + 5^2 = 386$
$\Rightarrow x^2 = 386 - 25$
$\Rightarrow x^2 = 361$

$$\Rightarrow x = \sqrt{361} = 19$$

100. (1) Let the required number be *x*.
As per given information,
$x^2 = (975)^2 - (585)^2$
$\Rightarrow x^2 = (975 + 585)(975 - 585)$
$\Rightarrow x^2 = 1560 \times 390$

$$\Rightarrow x = \sqrt{1560 \times 390}$$

$$= \sqrt{13 \times 12 \times 3 \times 13 \times 10 \times 10}$$

= 780

101. (4) Let $x + y = 20$ and
$x - y = 8$
$\therefore (x + y)(x - y) = 20 \times 8$
$\Rightarrow x^2 - y^2 = 160$

102. (3) Let the numbers be *x* and *y*. Then,
$x^2 + y^2 = 100$ ...(i)
$x^2 - y^2 = 28$ ...(ii)
On adding,
$2x^2 = 128$
$\Rightarrow x^2 = 64 \Rightarrow x = 8$
From equation (i),
$64 + y^2 = 100$
$\Rightarrow y^2 = 36 \Rightarrow y = 6$
∴ Required sum
= 8 + 6 = 14

103. (3) Check through options
When $x = 9$,
$2x - 3 = 2 \times 9 - 3 = 15 < 17$

104. (4) 1× 2 × 3 × 4 = 24
$\Rightarrow 24 + 1 = 25 = 5^2$;
2 × 3 × 4 × 5 = 120
$\Rightarrow 120 + 1 = 121 = 11^2$
∴ P = 1

105. (3) Expression

$$= \sqrt{\frac{8}{3}} = \sqrt{\frac{8 \times 3}{3 \times 3}} = \frac{\sqrt{24}}{3}$$

$$= \frac{4.898}{3} = 1.6326 \approx 1.633$$

106. (2) Let the number of boys and girls in the room be *x* and *y* respectively.
According to the question,
$x^2 = y^2 + 28$
$\Rightarrow x^2 - y^2 = 28$ .....(i)
and $x = y + 2$
$\Rightarrow x - y = 2$ .....(ii)
On dividing equation (i) by equation (ii), we have

$$\frac{x^2 - y^2}{x - y} = \frac{28}{2}$$

$$\Rightarrow \frac{(x+y)(x-y)}{x-y} = 14$$

$\Rightarrow x + y = 14$
∴ Total number of boys and girls = 14

107. (4) From the given alternatives,
$5^2 + 6^2 + 7^2 = 110$
∴ The smallest number = 5

108. (3) 37 is a prime number.
∴ 37 = 1 × 37
∴ Required answer

$$= \sqrt{37 - 1} = \sqrt{36} = 6$$

109. (3) According to the question,
$= 68^2 - 32^2 = (68 + 32)(68 - 32)$
= 100 × 36
$= 3600 = (60)^2$

110. (3) $x^2 + x = 2450$
$\Rightarrow x(x + 1) = 2450 = 49 \times 50$
$\therefore x = 49$

111. (4) Let the numbers be *x* and *y* and $x > y$.
$\therefore xy = 45$
and $x - y = 4$
$\therefore x^2 + y^2 = (x - y)^2 + 2xy$
$= (4)^2 + 2 \times 45 = 16 + 90$
= 106

112. (4) 1008 = 4 × 4 × 3 × 3 × 7

$$\therefore \frac{1008}{7} = (4 \times 3)^2 = (12)^2$$

113. (1) Obviously, 16 must be subtracted to make the result a perfect square.

i.e. $63520 - 16 = \sqrt{63504} = 252$

114. (2) The given number has 6 decimal places.

Now,

1	326	18
1	1	
28	226	
8	224	
36	2	

i.e. 326 – 2 = 324 Which is a perfect square of 18.
Therefore, 0.000002 should be subtracted from 0.000326 to make it a perfect square of 0.018.

115. (4) 5808 = 2 × 2 × 2 × 2 × 3 × 11 × 11 = $2^2 \times 2^2 \times 11^2 \times 3$
Therefore, when 5808 is multiplied by 3, then it will be perfect square number.

116. (4)

2	20184
2	10092
2	5046
3	2523
29	841
	29

∴ 20184 = 2 × 2 × 2 × 3 × 29 ×29 × = $2^2 \times 29^2 \times 2 \times 3$.
∴ Required number
= 2 × 3 = 6

117. (1) $41 \times 41 = 1681$
$42 \times 42 = 1764$
$\therefore$ Required answer
$= 1764 - 1728 = 36$

118. (1) $a = 64$ and $b = 289$

$\therefore \sqrt{a} = \sqrt{64} = 8$ and

$\sqrt{b} = \sqrt{289} = 17$

$$\therefore \left(\sqrt{\sqrt{a}+\sqrt{b}} - \sqrt{\sqrt{b}-\sqrt{a}}\right)^{\frac{1}{2}}$$

$$= \left(\sqrt{8+17} - \sqrt{17-8}\right)^{\frac{1}{2}}$$

$$= \left(\sqrt{25} - \sqrt{9}\right)^{\frac{1}{2}}$$

$$= (5-3)^{\frac{1}{2}} = (2)^{\frac{1}{2}}$$

119. (3)

2	$6\ \overline{40}\ \overline{09}$ | 253
2	4
45	240
5	225
503	1509
3	1509
506	×

$\therefore \sqrt{64009} = 253$

120. (2) Let the number of days of tour be x.
$\therefore$ Total expenditure $= x^2$
$\therefore x^2 = 361 \Rightarrow x = \sqrt{361} = 19$

121. (2) Expression $= \sqrt{10^{-6} \times 0.25}$

$$= \sqrt{\frac{0.25}{10^6}} = \sqrt{\frac{25}{10^6 \times 10^2}}$$

$$= \sqrt{\frac{25}{10^8}} = \frac{5}{10^4} = 0.0005$$

122. (4) $\dfrac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}}$

$$= \frac{3\sqrt{2}(\sqrt{6}-\sqrt{3})}{(\sqrt{6}+\sqrt{3})(\sqrt{6}-\sqrt{3})}$$

$$= \frac{3\sqrt{2}(\sqrt{6}-\sqrt{3})}{6-3}$$

$$= \sqrt{2}\left(\sqrt{6}-\sqrt{3}\right) = \sqrt{12} - \sqrt{6}$$

$= 2\sqrt{3} - \sqrt{6}$

$$\frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}}$$

$$= \frac{4\sqrt{3}(\sqrt{6}-\sqrt{2})}{(\sqrt{6}+\sqrt{2})(\sqrt{6}-\sqrt{2})}$$

$$= \frac{4\sqrt{3}(\sqrt{6}-\sqrt{2})}{6-2}$$

$= \sqrt{3}\left(\sqrt{6}-\sqrt{2}\right) = \sqrt{18} - \sqrt{6}$

$= 3\sqrt{2} - \sqrt{6}$

$$\frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}}$$

$$= \frac{\sqrt{6}\left(\sqrt{3}-\sqrt{2}\right)}{\left(\sqrt{3}+\sqrt{2}\right)\left(\sqrt{3}-\sqrt{2}\right)}$$

$$= \frac{\sqrt{18}-\sqrt{12}}{3-2}$$

$= 3\sqrt{2} - 2\sqrt{3}$

$\therefore$ Expression

$= 2\sqrt{3} - \sqrt{6} - \left(3\sqrt{2} - \sqrt{6}\right) +$

$3\sqrt{2} - 2\sqrt{3}$

$= 2\sqrt{3} - \sqrt{6} - 3\sqrt{2} + \sqrt{6} +$

$3\sqrt{2} - 2\sqrt{3} = 0$

123. (2) Expression $= \dfrac{4-\sqrt{0.04}}{4+\sqrt{0.4}}$

$$= \frac{4-0.2}{4+0.6}$$

$$= \frac{3.8}{4.6} = \frac{38}{46} = \frac{19}{23}$$

$\approx 0.83 \approx 0.8$

124. (2) $\sqrt{0.05 \times 0.5 \times a}$

$= 0.5 \times 0.05 \times \sqrt{b}$

On squaring both sides,
$0.05 \times 0.5 \times a = 0.5 \times 0.5 \times 0.05 \times 0.05 \times b$
$\Rightarrow a = 0.5 \times 0.05b$

$$\Rightarrow \frac{a}{b} = 0.5 \times 0.05 = 0.025$$

125. (1) Number of students in the last row $= \sqrt{1369} = 37$

Illustration :

3	$\overline{13}\ \overline{69}$ | 37
3	9
67	469
7	469
74	×

126. (1) $\sqrt{5} = 2.24$

$\sqrt{3} = 1.73$

$\sqrt{6} = 2.45$

$\sqrt{2} = 1.41$

$\therefore \sqrt{5} + \sqrt{3} = 2.24 + 1.73$
$= 3.97$

$\sqrt{6} + \sqrt{2} = 2.45 + 1.41 = 3.86$
Clearly, $3.97 > 3.86$

127. (4)

2	20184
2	10092
2	5046
3	2523
29	841
	29

$\therefore 20184 = 2 \times 2 \times 2 \times 3 \times 29 \times 29$
$= 2^2 \times 29^2 \times 2 \times 3$
$\therefore$ For making it a perfect square, 20184 should be multiplied by $2 \times 3 = 6$
$20184 \times 6 = 121104$;

$\sqrt{121104} = 348$

128. (4)

2	1008
2	504
2	252
2	126
3	63
3	21
	7

$\therefore 1008$
$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7$
$= 2^2 \times 2^2 \times 3^2 \times 7$
$\therefore$ Required answer $= 7$

129. (3) Let the numbers be x and y where $x > y$.
According to the question,
$x + y = 37$
and
$x^2 - y^2 = 185$
$\Rightarrow (x + y)(x - y) = 185$
$\Rightarrow 37(x - y) = 185$

$$\Rightarrow x - y = \frac{185}{37} = 5$$

130. (1)

1	$\overline{36}\,\overline{56}\,\overline{2}$ | 191
1	1
29	265
9	261
381	462
1	381
	81

$\therefore$ Number of armies left = 81

131. (3) $\dfrac{2+\sqrt{3}}{2} = \dfrac{2(2+\sqrt{3})}{4}$

$$= \frac{4+2\sqrt{3}}{4} = \frac{3+1+2\sqrt{3}}{4}$$

$$= \frac{\left(\sqrt{3}\right)^2 + (1)^2 + 2\times\sqrt{3}\times 1}{4}$$

$$= \left(\frac{\sqrt{3}+1}{2}\right)^2$$

$$\therefore \sqrt{\frac{2+\sqrt{3}}{2}} = \pm\frac{\sqrt{3}+1}{2}$$

132. (3) $11^2 = 121$
$111^2 = 12321$
$1111^2 = 1234321$
$11111^2 = 123454321$

133. (4)

5	59535
3	11907
3	3969
3	1323
3	441
3	147
7	49
	7

$\therefore 59535 = 3\times3\times3\times3\times7^2\times3\times5$
$= 3^2\times3^2\times7^2\times3\times5$
$\therefore$ According to the question,
$x = 3\times5 = 15$
$\therefore$ Sum of digits = 1 + 5 = 6

134. (2)

2	$\overline{6}\ \overline{60}\ \overline{49}$ | 257
2	4
45	260
5	225
507	3549
7	3549
514	×

$\therefore \sqrt{66049} = 257$
$\therefore$ Unit place digit = 7

135. (4) $\sqrt{0.000441} = \sqrt{\dfrac{441}{1000000}}$

$$= \frac{21}{1000} = 0.021$$

136. (1) Required sum = 121 + 144 + 169 + 196 + 225 + 256 + 289 = 1400

137. (2) $\sqrt{32146} > 179$
$179\times179 = 32041$
$\therefore$ Required answer
= 32146 – 32041 = 105

138. (1)

7	$\overline{54}\,\overline{16}\ *\ \overline{6}$ | 736
7	49
143	516
3	429
1466	87*6

$\because 1466\times6 = 8796$
$\therefore * = 9$

139. (2) Number of boys = $\sqrt{12544}$
= 112
Illustration :

1	$1\overline{25}\,\overline{44}$ | 112
1	1
21	× 25
1	21
222	444
2	444
224	×

140. (2) Let three positive integers be x, y and z.
According to the question,
$x + y + z = 18$ ..... (i)
$xyz = 162$ ..... (ii)
and $x + y = z$ ..... (iii)
From equation (i),
$z + z = 18 \Rightarrow 2z = 18 \Rightarrow z = 9$
$\therefore xyz = 162$
$\Rightarrow xy\times9 = 162$

$$\Rightarrow xy = \frac{162}{9} = 18 \quad \text{..... (iv)}$$

$\therefore (x-y)^2 = (x+y)^2 - 4xy$
$= (9)^2 - 4\times18$
$= 81 - 72 = 9$
$\therefore x - y = 3$
$\therefore x + y + x - y = 9 + 3$
$\Rightarrow 2x = 12 \Rightarrow x = 6$
$\therefore x + y + z = 18$
$\Rightarrow 6 + y + 9 = 18$
$\Rightarrow y = 18 - 15 = 3$
$\therefore x^2 + y^2 + z^2$
$= (6)^2 + (3)^2 + (9)^2$
$= 36 + 9 + 81 = 126$

141. (3) $x + y + z = 50$; $xyz = 3750$

$$\therefore \frac{1}{x}+\frac{1}{y}+\frac{1}{z} = \frac{yz+zx+xy}{xyz}$$

$$= \frac{31}{150}$$

$$\Rightarrow xy + yz + zx = \frac{31}{150}xyz$$

$$= \frac{31}{150}\times3750 = 775$$

$\therefore (x+y+z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$
$\Rightarrow (50)^2 = x^2 + y^2 + z^2 + 2\times775$
$\Rightarrow 2500 = x^2 + y^2 + z^2 + 1550$
$\Rightarrow x^2 + y^2 + z^2 = 2500 - 1550$
$= 950$

142. (2) Largest 6-digit number
= 999999

9	$\overline{99}\,\overline{99}\,\overline{99}$ | 999
9	81
189	1899
9	1701
1989	19899
9	17901
1998	1998
	0

$\therefore$ Required perfect square number = 999999 – 1998
= 998001

143. (3) Remainder on dividing $3^2 = 9$ by 6 = 3
Remainder on dividing $4^2 = 16$ by 6 = 4
Remainder on dividing $5^2 = 25$ by 6 = 1

144. (3)

1	18265	135
1	1	
23	× 82	
3	69	
265	1365	
5	1325	
	(40)	

∴ Required answer = 40

145. (3) Let the two real numbers be x and y.
According to the question,
$x^2 + y^2 = 41$
$x + y = 9$
$\therefore (x + y)^2 = x^2 + y^2 + 2xy$
$\Rightarrow 81 = 41 + 2xy$
$\Rightarrow 2xy = 81 - 41 = 40$

$$\Rightarrow xy = \frac{40}{2} = 20$$

$\therefore x^3 + y^3 = (x + y)^3 - 3xy(x + y)$
$= (9)^3 - 3 \times 20 (9)$
$= 729 - 540 = 189$

146. (1) Let the smaller number be x.
$\therefore$ Larger number = $2x$
According to the question,
$2x^2 = 2048$

$$\Rightarrow x^2 = \frac{2048}{2} = 1024$$

$$\therefore x = \sqrt{1024} = 32$$

147. (4) Let the number (n) be 6m + 3 where m = quotient.
On squaring both sides,
$n^2 = (6m + 3)^2$
$= 36\ m^2 + 36\ m + 3^2$
$\therefore$ Required remainder = 3^2
$\therefore$ Remainder on dividing 9 by 6 = 3

148. (4) Number of members in the club = x (let)
According to the question,

$$x^2 + \frac{x^2}{100} = 2525$$

$$\Rightarrow \frac{100x^2 + x^2}{100} = 2525$$

$$\Rightarrow 101x^2 = 252500$$

$$\Rightarrow x^2 = \frac{252500}{101} = 2500$$

$$\Rightarrow x = \sqrt{2500} = 50$$

149. (1) Let the positive numbers be x, y and z (respectively).
$\therefore x^2 + y^2 + z^2 = 323$ ... (i)
and, $x^2 + y^2 = 2z$ ... (ii)
$\therefore z^2 + 2z = 323$
$\Rightarrow z^2 + 2z - 323 = 0$
$\Rightarrow z^2 + 19z - 17z - 323 = 0$
$\Rightarrow z(z + 19) - 17(z + 19) = 0$
$\Rightarrow (z - 17)(z + 19) = 0$
$\Rightarrow z = 17$ because $z \neq -19$
$\therefore x^2 + y^2 = 2 \times 17 = 34$
$= 3^2 + 5^2$
$\therefore xyz = 3 \times 5 \times 17 = 255$

150. (2) Let the numbers be a and b where $a > b$.
According to the question,
$a - b = 9$ .... (i)
and $a^2 - b^2 = 207$
$\Rightarrow (a + b)(a - b) = 207$
$\Rightarrow 9(a + b) = 207$

$$\Rightarrow a + b = \frac{207}{9} = 23 \text{ .... (ii)}$$

On adding equations (i) and (ii),
$a + b + a - b = 23 + 9$
$\Rightarrow 2a = 32 \Rightarrow a = 16$
$\therefore a - b = 9$
$\Rightarrow 16 - b = 9$
$\Rightarrow b = 16 - 9 = 7$

151. (4)

2	$\overline{63}\overline{52}\overline{0}$	252
2	4	
45	235	
5	225	
502	1020	
2	1004	
504	16	

Now, 63520 − 16 = 63504
and $\sqrt{63504} = 252$
$\therefore$ Required number = 16

152. (1) The smallest 6-digit number = 100000

3	$\overline{10}\overline{00}\overline{00}$	316
3	9	
61	100	
1	61	
626	3900	
6	3756	
632	144	

Clearly,
$316 < \sqrt{100000} < 317$
$317 \times 317 = 100489$
$\therefore$ Required number = 100489

153. (2) Let the numbers be x and y where $x > y$.
$\therefore x + y = 80$
$x - y = 20$
$\therefore (x + y)(x - y) = 80 \times 20$
$\Rightarrow x^2 - y^2 = 1600$

154. (1) Suppose, the positive number be x.
According to the question,
$x^2 - 21x = 100$
$\Rightarrow x^2 - 21x - 100 = 0$
$\Rightarrow x^2 - 25x + 4x - 100 = 0$
$\Rightarrow x(x - 25) + 4(x - 25) = 0$
$\Rightarrow (x - 25)(x + 4) = 0$
$\Rightarrow x = 25$ because $x \neq -4$

155. (3) Let's find the square root of 36562.

1	$\overline{3}\ \overline{65}\ \overline{62}$	191
1	1	
29	265	
9	261	
381	462	
1	381	
382	81	

Clearly, the remaining army men = 81

156. (3)

1	$1\ \overline{6}\ \overline{8}\ \overline{0}\ \overline{0}$	129
1	1	
22	×68	
2	44	
249	2400	
9	2241	
258	159	⇒ Remainder

$\therefore$ Required number = 159
16800 − 159 = 16641
and $\sqrt{16641} = 129$

TYPE-IV

1. (1) Here, 22 − 15 − 7 = 0
We know that
$a^2 + b^3 + c^3 = 3abc$,
if $a + b + c = 0$
$\therefore (22)^3 + (-15)^3 + (-7)^3$
$= 3 \times 22 \times (-15)(-7) = 6930$

2. (2) On simplification,

$$\text{Expression} = \frac{2}{4} \times \frac{7}{10} \times 5$$

$$= \frac{7}{4} = 1\frac{3}{4}$$

3. (2) $\sqrt[3]{\frac{72.9}{0.4096}} = \sqrt[3]{\frac{729000}{4096}}$

$$= \sqrt[3]{\frac{(90)^3}{(16)^3}} = \frac{90}{16} = \frac{45}{8} = 5.625$$

4. (4) $(5.5)^3 - (4.5)^3$
$= (5.5 - 4.5)^3 + 3 \times 5.5 \times 4.5 (5.5 - 4.5)$
$= (1)^3 + 74.25 (1)$
$= 1 + 74.25 = 75.25$

5. (4) $\sqrt[3]{\frac{7}{875}} = \left(\frac{7}{875}\right)^{\frac{1}{3}}$

$$= \left(\frac{1}{125}\right)^{\frac{1}{3}} = \frac{1}{5}$$

6. (2) $\sqrt[3]{\frac{19}{513}} = \sqrt[3]{\frac{1}{27}} = \frac{1}{3}$

7. (3) We know that

$a^3 + b^3 + c^3 - 3abc$

$= (a+b+c)\ (a^2+b^2+c^2-ab-bc-ca)$

$= \frac{1}{2}(a+b+c)\ [(a-b)^2 + (b-c)^2 + (c-a)^2]$

$\therefore \sqrt[3]{(333)^3+(333)^3+(334)^3 - 3\times 333\times 333\times 334}$

$= \sqrt[3]{\frac{1}{2}(333+333+334)\ [(333-333)^2 + (333-334)^2 + (334-333)^2]}$

$= \sqrt[3]{\frac{1}{2}\times 1000\times 2} = \sqrt[3]{1000}$

$= \sqrt[3]{10\times 10\times 10} = 10$

8. (3) Here, $\sqrt[3]{175616} = 56$

$\therefore \sqrt[3]{175.616} = 5.6$

$\sqrt[3]{0.175616} = 0.56$

and $\sqrt[3]{0.000175616} = 0.056$

$\therefore$ Required sum

$= 56. + 0.56 + 0.056 = 6.216$

9. (4) $\sqrt[3]{\sqrt{0.000064}} = \sqrt[3]{0.008}$

$= \sqrt[3]{0.2\times 0.2\times 0.2}$

$= 0.2$

10. (2) Expression

$= \sqrt[3]{15612 + \sqrt{154+\sqrt{225}}}$

$= \sqrt[3]{15612 + \sqrt{154+15}}$

$= \sqrt[3]{15612+13}$

$= \sqrt[3]{15625} = 25$

11. (3)

$\sqrt[3]{0.000125} = \sqrt[3]{0.05\times 0.05\times 0.05}$

$= 0.05$

12. (3) First number $= (\sqrt{5})^2 = 5$

Let the second number be x.

$\therefore x^2 + 5^2 = 146$

$\Rightarrow x^2 = 146 - 25 = 121$

$\Rightarrow x = \sqrt{121} = 11$

$\therefore$ Cube of 11 $= 1331$

13. (1) $\sqrt[3]{1000} + \sqrt[3]{0.008} - \sqrt[3]{0.125}$

$= 10 + 0.2 - 0.5 = 9.7$

14. (2) Expression

$= \sqrt[3]{1 - \frac{127}{343}} = \sqrt[3]{\frac{343-127}{343}}$

$= \sqrt[3]{\frac{216}{343}} = \sqrt[3]{\frac{(6)^3}{(7)^3}} = \frac{6}{7} = 1 - \frac{1}{7}$

15. (1) $\sqrt[3]{3^n} = 27$

$\Rightarrow (3)^{\frac{n}{3}} = 3^3$

$\Rightarrow \frac{n}{3} = 3 \Rightarrow n = 3\times 3 = 9$

16. (2) Expression

$= \sqrt{\sqrt[3]{0.000729}}$

$= \sqrt{\sqrt[3]{0.09\times 0.09\times 0.09}}$

$= \sqrt{0.09} = \sqrt{0.3\times 0.3}$

$= 0.3$

17. (1) Expression $= \left(\sqrt{4^3+15^2}\right)^3$

$= \left(\sqrt{64+225}\right)^3 = \left(\sqrt{289}\right)^3$

$= (17)^3 = 4913$

18. (2) Expression $= \sqrt[3]{4\frac{12}{125}}$

$= \sqrt[3]{\frac{512}{125}} = \sqrt[3]{\frac{8\times 8\times 8}{5\times 5\times 5}} = \frac{8}{5} = 1.6$

19. (4) $1323 = 3\times 3\times 3\times 7\times 7$

$\therefore$ It must be multiplied by 7.

20. (2) $1440 = 2\times 2\times 2\times 2\times 2\times 3\times 3\times 5 = 2^3\times 2^2\times 3^2\times 5$

To make 1440 a perfect cube, it must be mulitplied by $2\times 3\times 5\times 5 = 150$.

$\therefore$ The required sum $= 1+5+0 = 6$

21. (3) $1800 = 2\times 2\times 2\times 3\times 3\times 5\times 5 = 2^3\times 3^2\times 5^2$

To make 1800 a perfect cube, it must be multiplied by 15 (least number).

$\therefore$ Required sum $= 1 + 5 = 6$

22. (2) Clearly, $\sqrt[3]{729} = 9$

$\therefore$ 19 should be added to 710 to get a perfect cube.

23. (2)

2	1944
2	972
2	486
3	243
3	81
3	27
3	9
	3

$\therefore 1944 = 2\times 2\times 2\times 3\times 3\times 3\times 3\times 3$

$= 2^3\times 3^3\times 3^2$

Clearly, 1944 should be multiplied by 3 to make the result a perfect cube.

24. (1) $3000 = 3\times 1000 = 3\times 10^3$

Clearly, when we divide 3000 by natural number 3, the quotient is 1000 which is a perfect cube.

25. (2)

2	864
2	432
2	216
2	108
2	54
3	27
3	9
	3

$\therefore 864 = 2^3\times 3^3\times 2^2$

For $864n$ to be a perfect cube, $n = 2$

26. (2) $675 = 5\times 5\times 3\times 3\times 3$

$\therefore$ Required number $= 5$

27. (2) $12\times 12\times 12 = 1728$

$\therefore$ Required number

$= 1728 - 1720 = 8$

28. (2) $4320 = 2\times 2\times 2\times 2\times 2\times 3\times 3\times 3\times 5$

$= 2^3\times 3^3\times 2^2\times 5$

$\therefore$ Required number $= 2\times 5\times 5 = 50$

29. (4) $343 = 7\times 7\times 7$

$125 = 5\times 5\times 5$

$81 = 3\times 3\times 3\times 3$

$64 = 8\times 8 = 4\times 4\times 4$

We see that 343 and 125 are only perfect cubes of 7 and 5 respectively. 81 is only a perfect square of 9.

64 is a perfect square of 8 as well as a perfect cube of 4.

30. (4) Let number be x

$\therefore$ According to question,

$x^3 - x^2 = 48 \quad \therefore x = 4$

31. (2) The number = 90 × A
= 3 × 3 × 2 × 5 × A
The least value of A for which the given number is a perfect cube
= 3 × 2^2 × 5^2
= 3 × 4 × 25 = 300

32. (1) $\sqrt{x} = \sqrt[3]{y}$

$\Rightarrow x^{\frac{1}{2}} = y^{\frac{1}{3}}$

$\Rightarrow (x^{\frac{1}{2}})^6 = (y^{\frac{1}{3}})^6$

$\Rightarrow x^3 = y^2$

33. (3) $x = \sqrt{3} + \sqrt{2}$

$\therefore \frac{1}{x} = \frac{1}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{3}-\sqrt{2}}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})}$

$= \frac{\sqrt{3}-\sqrt{2}}{3-2} = \sqrt{3}-\sqrt{2}$

$\therefore x - \frac{1}{x} = \sqrt{3}+\sqrt{2}-\sqrt{3}+\sqrt{2}$

$= 2\sqrt{2}$

$\therefore x^3 - \frac{1}{x^3} = \left(x - \frac{1}{x}\right)^3 + 3\left(x - \frac{1}{x}\right)$

$= \left(2\sqrt{2}\right)^3 + 3 \times 2\sqrt{2}$

$= 16\sqrt{2} + 6\sqrt{2} = 22\sqrt{2}$

34. (1) **Look at the pattern :**
1001 × 1001 = 1002001
1001×1001 × 1001 = 1003003001

35. (2)

5	625
5	125
5	25
	5

$\therefore$ 625 = 5 × 5 × 5 × 5 = 5^3 × 5
For the smallest cube number, 625 should be divided 5,
625 ÷ 5 = 125 = 5^3

36. (3) Let the numbers be a and b where $a > b$.
According to the question,
$a^3 + b^3 = 793$
and $a + b = 13$
$\therefore (a+b)^3 = a^3 + b^3 + 3ab(a+b)$
$\Rightarrow (13)^3 = 793 + 3ab \times 13$
$\Rightarrow 2197 = 793 + 39ab$
$\Rightarrow 39ab = 2197 - 793 = 1404$
$\Rightarrow ab = \frac{1404}{39} = 36$
$\therefore (a+b)^2 = (a+b)^2 - 4ab$
$= (13)^2 - 4 \times 36$
$= 169 - 144 = 25$
$\Rightarrow a - b = \sqrt{25} = 5$

37. (3) 243000 = 243 × 1000
= 3 × 3 × 3 × 3 × 3 × 10 × 10 × 10
= $3^3 \times 3^2 \times 10^3$
$\therefore$ Required number = 3^2 = 9

38. (4) Expression

$= \left(2 - \frac{1}{3}\right)\left(2 - \frac{3}{5}\right)\left(2 - \frac{5}{7}\right)....\left(2 - \frac{997}{999}\right)$

$= \left(\frac{6-1}{3}\right)\left(\frac{10-3}{5}\right)$

$\left(\frac{14-5}{7}\right)...\left(\frac{1998-997}{999}\right)$

$= \frac{5}{3} \times \frac{7}{5} \times \frac{9}{7} \times .... \times \frac{1001}{999}$

$= \frac{1001}{3}$

39. (4) $\sqrt[3]{79507} = 43$

$\therefore \sqrt[3]{79.507} + \sqrt[3]{0.079507} + \sqrt[3]{0.000079507}$
= 4.3 + 0.43 + 0.043
= 4.773

40. (4)

2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
	3

$\therefore$ 13824 = $2^3 \times 2^3 \times 2^3 \times 3^3$
$\therefore \sqrt[3]{-13824}$
$= \sqrt[3]{(-1)^3 2^3 \times 2^3 \times 2^3 \times 3^3}$
= (–1) 2 × 2 × 2 × 3 = –24

41. (1) $(105)^3 = (100+5)^3$
$= (100)^3 + (5)^3 + 3 \times 100 \times 5 (100 + 5)$
$[\because (a+b)^3 = a^3 + b^3 + 3ab(a+b)]$
= 1000000 + 125 + 1500 × 105
= 1000000 + 125 + 157500
= 1157625

42. (2)

2	37044
2	18522
3	9261
3	3087
3	1029
7	343
7	49
	7

$\therefore$ 37044 = 3 × 3 × 3 × 7 × 7 × 7 × 2 × 2
= $3^3 \times 7^3 \times 2^2$
$\therefore$ Required number = 2 × 2
= 4

43. (1) $(997)^3 = (1000-3)^3$
$= (1000)^3 - (3)^3 - 3 \times 1000 \times 3 (1000 - 3)$
= 1000000000 – 27 – 9000 × 997
= 1000000000 – 27 – 8973000
= 991026973

44. (2) Let the numbers be $3x$ and $4x$.
According to the question,
$(3x)^3 + (4x)^3 = 5824$
$\Rightarrow 27x^3 + 64x^3 = 5824$
$\Rightarrow 91x^3 = 5824$
$\Rightarrow x^3 = \frac{5824}{91} = 64$
$\Rightarrow x = \sqrt[3]{64} = 4$
$\therefore$ Sum of numbers
$= 3x + 4x = 7x$
= 7 × 4 = 28

TYPE-V

1. (3) ? =

$$\frac{(0.0539 - 0.002) \times 0.4 + 0.56 \times 0.07}{0.04 \times 0.25}$$

$= \frac{0.0519 \times 0.4 + 0.0392}{0.01}$

$= \frac{0.02076 + 0.0392}{0.01}$

$= \frac{0.05996}{0.01} = 5.996$

TEST YOURSELF

1. Simplify :

$$\frac{3.5\times1.5}{0.025\div0.125\times7.5}\times\frac{1}{3+\frac{1}{1+\frac{1}{2}}}$$

(1) 0.9 (2) 0.95
(3) 0.095 (4) 0.082

2. Simplify :

$$\frac{3}{4+\frac{5}{6+\frac{7}{8}}}-\frac{3}{5}\div\frac{1}{2}\text{ of }1\frac{1}{5}+1\frac{3}{26}$$

(1) $\frac{3}{4}$ (2) $\frac{1}{2}$
(3) $\frac{3}{5}$ (4) $\frac{3}{7}$

3. Simplify :

$$999\frac{998}{999}\times999+999$$

(1) 999997 (2) 999998
(3) 99998 (4) 999994

4. Simplify

$$2\div\frac{3}{17}\text{ of }\left(2\frac{3}{4}+3\frac{5}{8}\right)+\frac{2}{5}\div2\frac{1}{5}+\frac{2}{9}$$

(1) $\frac{9}{17}$ (2) $\frac{7}{11}$
(3) $\frac{13}{11}$ (4) $\frac{24}{11}$

5. Simplify :

$$120+3\,of\,5\div\left[7\times2\left\{10\div5\left(24-10\times2+\overline{7+3\times10\div5}\right)\right\}\right]$$

(1) 120.03 (2) 116.04
(3) 118 (4) 125

6. $\frac{2.5\times3+7.5\div2.5-0.5\text{ of }3}{47+12\div1.5-6\text{ of }2\times3}=?$

(1) $\frac{3}{17}$ (2) $\frac{9}{19}$
(3) $\frac{4}{11}$ (4) $\frac{3}{11}$

7. Simplilfy :

$$\frac{17}{7+\frac{3}{4-2\frac{3}{4}}}\times\frac{2021}{2193}\div\left(1\frac{37}{48}-\frac{15}{16}\right)+\frac{3}{4}\,of\,\frac{3\frac{1}{2}}{2\frac{1}{2}}$$

(1) $2\frac{1}{8}$ (2) $4\frac{1}{8}$
(3) $3\frac{1}{8}$ (4) $3\frac{1}{7}$

8. $\frac{1\frac{7}{9}\text{ of }\frac{27}{64}}{\frac{11}{12}\times9\frac{9}{11}}\div\frac{4\frac{4}{7}\text{ of }\frac{21}{160}}{2\frac{5}{6}\div2\frac{2}{15}}=?$

(1) $\frac{425}{2344}$ (2) $\frac{425}{2434}$
(3) $\frac{421}{2443}$ (4) $\frac{425}{2304}$

9. Simplify :

$$\frac{8\frac{3}{5}+7\frac{3}{4}+5\frac{2}{3}-4\frac{1}{2}}{13-11\frac{9}{10}+10\frac{7}{9}-9\frac{17}{20}}\,of\,\frac{2}{11}\,of\,365$$

(1) $573\frac{3}{11}$ (2) $571\frac{7}{11}$
(3) $572\frac{3}{11}$ (4) $575\frac{4}{11}$

10. Simplify :

$$\frac{1}{8}of\left(\frac{1}{10}-\frac{1}{11}\right)\div\frac{\frac{1}{7}-\frac{1}{9}\div\left(\frac{4}{9}+\frac{4}{11}\right)}{\frac{1}{7}+\frac{1}{9}\div\left(\frac{4}{9}-\frac{4}{11}\right)}\times\frac{\frac{1}{3}+\frac{1}{7}\div\left(\frac{1}{7}-\frac{1}{9}\right)}{\left(\frac{1}{3}+\frac{1}{7}\right)\div\frac{1}{7}-\frac{1}{9}}$$

(1) $\frac{85}{176}$ (2) $\frac{83}{176}$
(3) 83 (4) 86

11. Simplify

$$\frac{2\frac{4}{9}\div3\frac{2}{3}\text{ of }\frac{2}{5}\times\frac{3}{5}+1\frac{1}{9}}{1\frac{1}{9}\times\frac{3}{4}\text{ of }1\frac{2}{5}\div\frac{21}{38}-\frac{1}{3}}-\frac{5\frac{1}{2}-\frac{3}{4}}{2\frac{1}{5}\times1\frac{9}{11}}$$

(1) 1 (2) 0
(3) 2 (4) 3

12. Simplify :

$$\frac{\frac{5}{6}+\frac{7}{8}\,of\,\frac{4}{5}\div\frac{3}{4}\,of\,\frac{9}{10}}{8\frac{1}{3}-\left(\frac{4}{1-\frac{7}{8}}\,of\,2\frac{1}{4}\right)\div\frac{7}{9}\,of\,12}\,of\,6\frac{1}{2}+5\frac{1}{9}$$

(1) $24\frac{1}{4}$ (2) $24\frac{3}{4}$
(3) $22\frac{1}{2}$ (4) $23\frac{1}{3}$

13. Simplify :

$$\frac{\frac{2}{3}\div\frac{3}{4}\text{of}\frac{5}{6}}{\frac{2}{3}\div\frac{3}{4}\times\frac{5}{6}}+\frac{2+2\times2}{2\div2\times2}\div\frac{\frac{1}{2}\div\frac{1}{2}\text{of}\frac{1}{2}}{\frac{1}{2}+\frac{1}{2}\text{of}\frac{1}{2}}$$

(1) 2 (2) 2.5
(3) 4 (4) 4.5

14. Simplify :

$$\frac{5+5\times5}{5\times5+5}\times\frac{\frac{1}{5}\div\frac{1}{5}\,of\,\frac{1}{5}}{\frac{1}{5}\,of\,\frac{1}{5}\div\frac{1}{5}}\times\left(5-\frac{1}{5}\right)\times\frac{1}{\frac{46}{5}-\frac{3}{1-\frac{2}{3}}}$$

(1) 400 (2) 500
(3) 600 (4) 300

15. Simplify $1+\frac{1}{1+\frac{1}{1+\frac{1}{9}}}$

(1) $1\frac{9}{19}$ (2) $1\frac{10}{19}$
(3) $2\frac{9}{19}$ (4) $3\frac{9}{19}$

16. Compute the following :

$$7+\frac{2}{5+\frac{3}{4+\frac{2}{3+\frac{1}{4}}}}$$

(1) $3\frac{40}{113}$ (2) $6\frac{40}{113}$
(3) $7\frac{40}{113}$ (4) $5\frac{40}{113}$

17. Simplify :

$$7\frac{1}{2}-\left[2\frac{1}{4}\div\left\{1\frac{1}{4}-\frac{1}{2}\left(1\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)\right\}\right]$$

(1) $4\frac{1}{2}$ (2) $3\frac{1}{2}$

(3) $4\frac{1}{3}$ (4) $\frac{1}{3}$

18. Simplify :

$$3\div\left[(8-5)\div\left\{(4-2)\div\left(2+\frac{8}{13}\right)\right\}\right]=?$$

(1) $\frac{17}{13}$ (2) $\frac{13}{17}$

(3) $\frac{15}{17}$ (4) $\frac{17}{15}$

19. Simplify

$$5\frac{1}{2}-\left[2\frac{1}{3}\div\left\{\frac{3}{4}-\frac{1}{2}\left(\frac{2}{3}-\overline{\frac{1}{6}-\frac{1}{8}}\right)\right\}\right]$$

(1) $\frac{1}{2}$ (2) $\frac{1}{4}$

(3) $\frac{1}{6}$ (4) $\frac{2}{3}$

SHORT ANSWERS

1. (2)	**2.** (1)	**3.** (2)	**4.** (4)
5. (1)	**6.** (2)	**7.** (3)	**8.** (4)
9. (1)	**10.** (1)	**11.** (2)	**12.** (2)
13. (2)	**14.** (3)	**15.** (2)	**16.** (3)
17. (1)	**18.** (2)	**19.** (3)	

EXPLANATIONS

1. (2) Expression =

$$\frac{3.5\times1.5}{0.025\times\frac{1}{0.125}\times7.5}\times\frac{1}{3+\frac{1}{1+\frac{1}{2}}}$$

$$=\frac{3.5\times1.5\times125}{25\times7.5}\times\frac{1}{3+\frac{1}{\frac{3}{2}}}$$

$$=3.5\times\frac{1}{3+\frac{2}{3}}=3.5\times\frac{1}{\frac{9+2}{3}}$$

$$=\frac{3.5\times3}{11}=\frac{10.5}{11}=0.95$$

2. (1) $\frac{3}{4+\frac{5}{6+\frac{7}{8}}}=\frac{3}{4+\frac{5}{\frac{48+7}{8}}}$

$$=\frac{3}{4+\frac{5\times8}{55}}$$

$$=\frac{3}{4+\frac{8}{11}}$$

$$=\frac{3}{\frac{44+8}{11}}=\frac{3\times11}{52}=\frac{33}{52}$$

$\therefore$ Expression $=\frac{33}{52}-\frac{3}{5}\div\frac{1}{2}$ of $1\frac{1}{5}+1\frac{3}{26}$

$$=\frac{33}{52}-\frac{3}{5}\div\frac{1}{2}\times\frac{6}{5}+\frac{29}{26}$$

$$=\frac{33}{52}-\frac{3}{5}\times\frac{5}{3}+\frac{29}{26}$$

$$=\frac{33}{52}-1+\frac{29}{26}$$

$$=\frac{33-52+58}{52}=\frac{39}{52}=\frac{3}{4}$$

3. (2) $\left(999+\frac{998}{999}\right)999+999$

$= (999)^2 + 998 + 999$
$= (1000 - 1)^2 + 998 + 999$
$= 1000000 + 1 - 2000 + 998 + 999$
$= 999998$

4. (4) The given expression

$$=2\div\frac{3}{17}\text{ of }\left(\frac{11}{4}+\frac{29}{8}\right)+\frac{2}{5}\div\frac{11}{5}+\frac{2}{9}$$

$$=2\div\frac{3}{17}\text{ of }\left(\frac{22+29}{8}\right)+\frac{2}{5}\div\frac{11}{5}+\frac{2}{9}$$

$$=2\div\frac{3}{17}\text{ of }\frac{51}{8}+\frac{2}{5}\div\frac{11}{5}+\frac{2}{9}$$

$$=2\div\frac{3}{17}\times\frac{51}{8}+\frac{2}{5}\div\frac{11}{5}+\frac{2}{9}$$

$$=2\div\frac{9}{8}+\frac{2}{5}\div\frac{11}{5}+\frac{2}{9}$$

$$=2\times\frac{8}{9}+\frac{2}{5}\times\frac{5}{11}+\frac{2}{9}$$

$$=\frac{16}{9}+\frac{2}{11}+\frac{2}{9}=\frac{176+18+22}{99}$$

$$=\frac{216}{99}=\frac{24}{11}$$

5. (1) The given expression

$120 + 3 \text{ of } 5 \div \left[7\times2\left\{10\div5\left(24-10\times2+\overline{7+3\times10\div5}\right)\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\left\{10\div5\left(24-10\times2+\overline{7+3\times2}\right)\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\left\{10\div5\left(24-10\times2+\overline{7+6}\right)\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\left\{10\div5\left(24-10\times2+13\right)\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\left\{10\div5\left(24-20+13\right)\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\left\{10\div5\times17\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\left\{10\times\frac{1}{5}\times17\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\left\{2\times17\right\}\right]$

$= 120 + 3 \text{ of } 5 \div \left[7\times2\times34\right]$

$= 120 + 3 \times 5 \div 476 = 120 + 15 \div 476$

$$=120+\frac{15}{476}=120\frac{15}{476}$$

$= 120.03$

6. (2) The given expression

$$=\frac{2.5\times3+7.5\div2.5-0.5\text{ of }3}{47+12\div1.5-6\text{ of }2\times3}$$

$$=\frac{2.5\times3+7.5\times\frac{1}{2.5}-0.5\times3}{47+12\times\frac{1}{1.5}-6\times2\times3}$$

$$=\frac{7.5+3-1.5}{47+8-36}=\frac{9}{19}$$

7. (3)

$$\frac{17}{7+\frac{3}{4-\frac{11}{4}}}\times\frac{2021}{2193}\div\left(\frac{85}{48}-\frac{15}{16}\right)+\frac{3}{4}\text{ of }\frac{3\frac{3}{2}}{\frac{5}{2}}$$

$$=\frac{17}{7+\frac{3}{\frac{16-11}{4}}}\times\frac{47}{51}\div\left(\frac{85}{48}-\frac{15}{16}\right)+\frac{3}{4}\text{ of }\frac{3\frac{3}{4}}{\frac{5}{2}}$$

$$=\frac{17}{7+\frac{12}{5}}\times\frac{47}{51}\div\left(\frac{85-45}{48}\right)+\frac{3}{4}\times\frac{15}{4}\times\frac{2}{5}$$

$$= \frac{17}{\frac{35+12}{5}} \times \frac{47}{51} \div \frac{40}{48} + \frac{9}{8}$$

$$= \frac{17 \times 5}{47} \times \frac{47}{51} \times \frac{48}{40} + \frac{9}{8}$$

$$= 2 + 1\frac{1}{8} = 3\frac{1}{8}$$

8. (4) $$\frac{\frac{16}{9} \text{ of } \frac{27}{64}}{\frac{11}{12} \times \frac{108}{11}} \div \frac{\frac{32}{7} \text{ of } \frac{21}{160}}{\frac{17}{6} \div \frac{32}{15}}$$

$$= \frac{\frac{16}{9} \times \frac{27}{64}}{\frac{11}{12} \times \frac{108}{11}} \div \frac{\frac{32}{7} \times \frac{21}{160}}{\frac{17}{6} \times \frac{15}{32}}$$

$$= \frac{\frac{3}{4}}{\frac{9}{1}} \div \frac{\frac{3}{5}}{\frac{17 \times 5}{32 \times 2}}$$

$$= \frac{3}{4} \times \frac{1}{9} \div \frac{3 \times 2 \times 32}{17 \times 5 \times 5}$$

$$= \frac{1}{4} \times \frac{1}{3} \times \frac{17 \times 5 \times 5}{3 \times 2 \times 32} = \frac{425}{2304}$$

9. (1)

$$\frac{\frac{43}{5} + \frac{31}{4} + \frac{17}{3} - \frac{9}{2}}{13 - \frac{119}{10} + \frac{97}{9} - \frac{197}{20}} \text{ of } \frac{2}{11} \text{ of } 365$$

$$= \frac{\frac{516 + 465 + 340 - 270}{60}}{\frac{2340 - 2142 + 1940 - 1773}{180}} \text{ of } \frac{2}{11} \times 365$$

$$= \frac{\frac{1321 - 270}{60}}{\frac{4280 - 3915}{180}} \text{ of } \frac{2 \times 365}{11}$$

$$= \frac{\frac{1051}{60}}{\frac{365}{180}} \text{ of } \frac{2 \times 365}{11}$$

$$= \frac{1051}{60} \times \frac{180}{365} \times \frac{2 \times 365}{11}$$

$$= \frac{1051 \times 3 \times 2}{11}$$

$$= \frac{6306}{11} = 573\frac{3}{11}$$

10. (1) $$\frac{1}{8} of \left(\frac{11-10}{110}\right) \div \frac{\frac{1}{7} - \frac{1}{9} \div \left(\frac{44+36}{99}\right)}{\frac{1}{7} + \frac{1}{9} \div \left(\frac{44-36}{99}\right)} \times \frac{\frac{1}{3} + \frac{1}{7} \div \left(\frac{9-7}{63}\right)}{\left(\frac{7+3}{21}\right) \div \frac{1}{7} - \frac{1}{9}}$$

$$= \frac{1}{8} \text{ of } \frac{1}{110} \div \frac{\frac{1}{7} - \frac{1}{9} \times \frac{99}{80}}{\frac{1}{7} + \frac{1}{9} \times \frac{99}{8}} \times \frac{\frac{1}{3} + \frac{1}{7} \times \frac{63}{2}}{\frac{10}{21} \times \frac{7}{1} - \frac{1}{9}}$$

$$= \frac{1}{8} \text{ of } \frac{1}{110} \div \frac{\frac{1}{7} - \frac{11}{80}}{\frac{1}{7} + \frac{11}{8}} \times \frac{\frac{1}{3} + \frac{9}{2}}{\frac{10}{3} - \frac{1}{9}}$$

$$= \frac{1}{8} \times \frac{1}{110} \div \frac{\frac{80-77}{560}}{\frac{8177}{56}} \times \frac{\frac{2127}{6}}{\frac{30-1}{9}}$$

$$= \frac{1}{8} \times \frac{1}{110} \times \frac{850}{3} \times \frac{9}{6} = \frac{85}{176}$$

11. (2)

$$\frac{2\frac{4}{9} \div 3\frac{2}{3} \text{ of } \frac{2}{5} \times \frac{3}{5} + 1\frac{1}{9}}{1\frac{1}{9} \times \frac{3}{4} \text{ of } 1\frac{2}{5} \div \frac{21}{38} - \frac{1}{3}} - \frac{5\frac{1}{2} - \frac{3}{4}}{2\frac{1}{5} \times 1\frac{9}{11}}$$

$$= \frac{\frac{22}{9} \div \frac{11}{3} \text{ of } \frac{2}{5} \times \frac{3}{5} + \frac{10}{9}}{\frac{10}{9} \times \frac{3}{4} \text{ of } \frac{7}{5} \div \frac{21}{38} - \frac{1}{3}} - \frac{\frac{11}{2} - \frac{3}{4}}{\frac{11}{5} \times \frac{20}{11}}$$

$$= \frac{\frac{22}{9} \div \frac{22}{15} \times \frac{3}{5} + \frac{10}{9}}{\frac{10}{9} \times \frac{21}{20} \div \frac{21}{38} - \frac{1}{3}} - \frac{22-3}{4}$$

$$= \frac{\left(\frac{22}{9} \times \frac{15}{22}\right) \times \frac{3}{5} + \frac{10}{9}}{\frac{10}{9} \times \left(\frac{21}{20} \times \frac{38}{21}\right) - \frac{1}{3}} - \frac{\frac{19}{4}}{4}$$

$$= \frac{\frac{5}{3} \times \frac{3}{5} + \frac{10}{9}}{\frac{10}{9} \times \frac{19}{10} - \frac{1}{3}} - \frac{19}{4} \times \frac{1}{4}$$

$$= \frac{1 + \frac{10}{9}}{\frac{19}{9} - \frac{1}{3}} - \frac{19}{16} = \frac{\frac{9+10}{9}}{\frac{19-3}{9}} - \frac{19}{16}$$

$$= \frac{\frac{19}{9}}{\frac{16}{9}} - \frac{19}{16} = \frac{19}{16} - \frac{19}{16} = 0$$

12. (2)

$$\frac{\frac{5}{6} + \left(\frac{7}{8} \times \frac{4}{5}\right) \div \left(\frac{3}{4} \times \frac{9}{10}\right)}{\frac{25}{3} - \left(\frac{4}{\frac{8-7}{8}} of \frac{9}{4}\right) \div \left(\frac{7}{9} \times 12\right)} of \frac{13}{2} + \frac{46}{9}$$

$$= \frac{\frac{5}{6} + \frac{7}{10} \div \frac{27}{40}}{\frac{25}{3} - 32 \times \frac{9}{4} \div \frac{28}{3}} \text{ of } \frac{13}{2} + \frac{46}{9}$$

$$= \frac{\frac{5}{6} + \frac{7}{10} \times \frac{40}{27}}{\frac{25}{3} - 32 \times \frac{9}{4} \times \frac{3}{28}} \text{ of } \frac{13}{2} + \frac{46}{9}$$

$$= \frac{\frac{5}{6} + \frac{28}{27}}{\frac{25}{3} - \frac{54}{7}} \text{ of } \frac{13}{2} + \frac{46}{9}$$

$$= \frac{\frac{45+56}{54}}{\frac{175-162}{21}} \text{ of } \frac{13}{2} + \frac{46}{9}$$

$$= \frac{101}{54} \times \frac{21}{13} \times \frac{13}{2} + \frac{46}{9}$$

$$= \frac{707}{36} + \frac{46}{9} = \frac{707+184}{36}$$

$$8\frac{91}{36} = 24\frac{27}{36} = 24\frac{3}{4}$$

13. (2) The given expression

$$\frac{\frac{2}{3} \div \frac{3}{4} \text{ of } \frac{5}{6}}{\frac{2}{3} \div \frac{3}{4} \times \frac{5}{6}} + \frac{2+2\times2}{2\div2\times2} \div \frac{\frac{1}{2} \div \frac{1}{2} \text{ of } \frac{1}{2}}{\frac{1}{2} + \frac{1}{2} \text{ of } \frac{1}{2}}$$

$$= \frac{\frac{2}{3} \div \left(\frac{3}{4} \times \frac{5}{6}\right)}{\left(\frac{2}{3} \times \frac{4}{3}\right) \times \frac{5}{6}} + \frac{2+4}{\left(2 \times \frac{1}{2}\right) \times 2} \div \frac{\frac{1}{2} \div \left(\frac{1}{2} \times \frac{1}{2}\right)}{\frac{1}{2} + \frac{1}{2} \times \frac{1}{2}}$$

$$= \frac{\frac{2}{3} \div \frac{5}{8}}{\frac{8}{9} \times \frac{5}{6}} + \frac{6}{2} \div \frac{\frac{1}{2} \div \frac{1}{4}}{\frac{1}{2} + \frac{1}{4}}$$

$$= \frac{\frac{2}{3} \times \frac{8}{5}}{\frac{20}{27}} + 3 \div \frac{\frac{1}{2} \times 4}{\frac{2+1}{4}}$$

$$= \frac{16}{15} \times \frac{27}{20} + 3 \div \frac{2}{\frac{3}{4}}$$

$$= \frac{36}{25} + 3 \div \left(2 \times \frac{4}{3}\right)$$

$$= \frac{36}{25} + 3 \div \frac{8}{3} = \frac{36}{25} + 3 \times \frac{3}{8}$$

$$= \frac{288+225}{200} = \frac{513}{200} = 2\frac{113}{200} = 2.5$$

14. (3) The given expression

$$= \frac{5+25}{25+5} \times \frac{\frac{1}{5} \div \left(\frac{1}{5} \times \frac{1}{5}\right)}{\left(\frac{1}{5} \times \frac{1}{5}\right) \div \frac{1}{5}} \times \left(\frac{25-1}{5}\right) \times \frac{1}{\frac{46}{5} - \frac{3}{\frac{3-2}{3}}}$$

$$= \frac{30}{30} \times \frac{\frac{1}{5} \div \frac{1}{25}}{\frac{1}{25} \div \frac{1}{5}} \times \frac{24}{5} \times \frac{1}{\frac{46}{5} - \frac{3}{\frac{1}{3}}}$$

$$= \frac{\frac{1}{5} \times 25}{\frac{1}{25} \times 5} \times \frac{24}{5} \times \frac{1}{\frac{46}{5} - 9}$$

$$= \frac{5}{\frac{1}{5}} \times \frac{24}{5} \times \frac{1}{\frac{46-45}{5}}$$

$$= 5 \times 5 \times \frac{24}{5} \times \frac{5}{1} = 600$$

15. (2) It is a continued fraction. In such problems, we should start from the bottom and work upwards.

The given expression

$$= 1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{9}}} = 1 + \frac{1}{1 + \frac{1}{\frac{9+1}{9}}}$$

$$= 1 + \frac{1}{1 + \frac{1}{\frac{10}{9}}} = 1 + \frac{1}{1 + 1 \times \frac{9}{10}}$$

$$= 1 + \frac{1}{1 + \frac{9}{10}} = 1 + \frac{1}{\frac{10+9}{10}}$$

$$= 1 + \frac{10}{19} = \frac{19+10}{19} = \frac{29}{19} = 1\frac{10}{19}$$

16. (3) $7 + \cfrac{2}{5 + \cfrac{3}{4 + \cfrac{2}{3 + \frac{1}{4}}}}$

$$= 7 + \cfrac{2}{5 + \cfrac{3}{4 + \cfrac{2}{\frac{12+1}{4}}}}$$

$$= 7 + \cfrac{2}{5 + \cfrac{3}{4 + \frac{2 \times 4}{13}}}$$

$$= 7 + \cfrac{2}{5 + \cfrac{3}{4 + \frac{8}{13}}}$$

$$= 7 + \cfrac{2}{5 + \cfrac{3}{\frac{52+8}{13}}}$$

$$= 7 + \cfrac{2}{5 + 3 \times \frac{13}{60}}$$

$$= 7 + \frac{2}{5 + \frac{13}{20}} = 7 + \frac{2}{\frac{100+13}{20}}$$

$$= 7 + \frac{2 \times 20}{113}$$

$$= 7 + \frac{40}{113} = 7\frac{40}{113}$$

17. (1) The given expression

$$= 7\frac{1}{2} - \left[2\frac{1}{4} \div \left\{1\frac{1}{4} - \frac{1}{2}\left(1\frac{1}{2} - \frac{1}{3} - \frac{1}{6}\right)\right\}\right]$$

$$= \frac{15}{2} - \left[\frac{9}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{3}{2} - \frac{1}{3} - \frac{1}{6}\right)\right\}\right]$$

$$= \frac{15}{2} - \left[\frac{9}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{9-2-1}{6}\right)\right\}\right]$$

$$= \frac{15}{2} - \left[\frac{9}{4} \div \left\{\frac{5}{4} - \frac{1}{2} \times 1\right\}\right]$$

$$= \frac{15}{2} - \left[\frac{9}{4} \div \left\{\frac{5-2}{4}\right\}\right]$$

$$= \frac{15}{2} - \left[\frac{9}{4} \div \frac{3}{4}\right]$$

$$= \frac{15}{2} - \left[\frac{9}{4} \times \frac{4}{3}\right]$$

$$= \frac{15}{2} - 3 = \frac{15-6}{2} = \frac{9}{2} = 4\frac{1}{2}$$

18. (2) The given expression

$$= 3 \div \left[(8-5) \div \left\{(4-2) \div \left(2 + \frac{8}{13}\right)\right\}\right]$$

$$= 3 \div \left[3 \div \left\{2 \div \left(\frac{26+8}{13}\right)\right\}\right]$$

$$= 3 \div \left[3 \div \left\{2 \div \frac{34}{13}\right\}\right]$$

$$= 3 \div \left[3 \div \left\{2 \times \frac{13}{34}\right\}\right]$$

$$= 3 \div \left[\frac{3 \times 34}{26}\right] = \frac{3 \times 26}{3 \times 34} = \frac{13}{17}$$

19. (3) The given expression

$$= 5\frac{1}{2} - \left[2\frac{1}{3} \div \left\{\frac{3}{4} - \frac{1}{2}\left(\frac{2}{3} - \overline{\frac{1}{6} - \frac{1}{8}}\right)\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \left\{\frac{3}{4} - \frac{1}{2}\left(\frac{2}{3} - \overline{\frac{1}{6} - \frac{1}{8}}\right)\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \left\{\frac{3}{4} - \frac{1}{2}\left(\frac{2}{3} - \frac{4-3}{24}\right)\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \left\{\frac{3}{4} - \frac{1}{2}\left(\frac{2}{3} - \frac{1}{24}\right)\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \left\{\frac{3}{4} - \frac{1}{2}\left(\frac{16-1}{24}\right)\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \left\{\frac{3}{4} - \frac{1}{2} \times \frac{15}{24}\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \left\{\frac{3}{4} - \frac{15}{48}\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \left\{\frac{36-15}{48}\right\}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \div \frac{21}{48}\right]$$

$$= \frac{11}{2} - \left[\frac{7}{3} \times \frac{48}{21}\right]$$

$$= \frac{11}{2} - \frac{16}{3} = \frac{33-32}{6} = \frac{1}{6}$$

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