81. L.C.M. of 2, 4, 6, 8, 10, 12 is 120.
So, the bells will toll together after every 120 seconds, *i.e.*, 2 minutes.
In 30 minutes, they will toll together $\left[\left(\frac{30}{2}\right)+1\right]$ = 16 times.

82. Interval after which the devices will beep together
= (L.C.M. of 30, 60, 90, 105) min. = 1260 min. = 21 hrs.
So, the devices will again beep together 21 hrs. after 12 noon *i.e.*, at 9 a.m.

83. L.C.M. of 252, 308 and 198 = 2772.
So, A, B and C will again meet at the starting point in 2772 sec. *i.e.*, 46 min. 12 sec.

5. **Dividing a Decimal Fraction By a Decimal Fraction** : Multiply both the dividend and the divisor by a suitable power of 10 to make divisor a whole number. Now, proceed as above.

Thus, $\frac{0.00066}{0.11} = \frac{0.00066 \times 100}{0.11 \times 100} = \frac{0.066}{11} = .006.$

V. Comparison of Fractions : Suppose some fractions are to be arranged in ascending or descending order of magnitude. Then, convert each one of the given fractions in the decimal form, and arrange them accordingly.

Suppose, we have to arrange the fractions $\frac{3}{5}, \frac{6}{7}$ and $\frac{7}{9}$ in descending order.

Now, $\frac{3}{5} = 0.6, \frac{6}{7} = 0.857, \frac{7}{9} = 0.777.....$

Since $0.857 > 0.777 ..... > 0.6$, so $\frac{6}{7} > \frac{7}{9} > \frac{3}{5}$.

VI. Recurring Decimal : If in a decimal fraction, a figure or a set of figures is repeated continuously, then such a number is called a ***recurring decimal***.

In a recurring decimal, if a single figure is repeated, then it is expressed by putting a dot on it. If a set of figures is repeated, it is expressed by putting a bar on the set.

Thus, $\frac{1}{3} = 0.333 ..... = 0.\dot{3}$; $\frac{22}{7} = 3.142857142857 ..... = 3.\overline{142857}$.

Pure Recurring Decimal : A decimal fraction in which all the figures after the decimal point are repeated, is called a pure recurring decimal.

Converting a Pure Recurring Decimal Into Vulgar Fraction : Write the repeated figures only once in the numerator and take as many nines in the denominator as is the number of repeating figures.

Thus, $0.\dot{5} = \frac{5}{9}$; $0.\overline{53} = \frac{53}{99}$; $0.\overline{067} = \frac{67}{999}$; etc.

Mixed Recurring Decimal : A decimal fraction in which some figures do not repeat and some of them are repeated, is called a mixed recurring decimal.

e.g., $0.17333 ..... = 0.17\dot{3}$.

Converting a Mixed Recurring Decimal Into Vulgar Fraction : In the numerator, take the difference between the number formed by all the digits after decimal point (taking repeated digits only once) and that formed by the digits which are not repeated. In the denominator, take the number formed by as many nines as there are repeating digits followed by as many zeros as is the number of non-repeating digits.

Thus, $0.16 = \frac{16-1}{90} = \frac{15}{90} = \frac{1}{6}$; $0.2\overline{273} = \frac{2273-22}{9900} = \frac{2251}{9900}$.

VII. Some Basic Formulae :

1. $(a + b)(a - b) = (a^2 - b^2)$.
2. $(a + b)^2 = (a^2 + b^2 + 2ab)$.
3. $(a - b)^2 = (a^2 + b^2 - 2ab)$.
4. $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$.
5. $(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$
6. $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$.
7. $(a^3 + b^3 + c^3 - 3abc) = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ac)$.
8. When $a + b + c = 0$, then $a^3 + b^3 + c^3 = 3abc$.

SOLVED EXAMPLES

Ex. 1. *Convert the following into vulgar fractions :*
(i) 0.75 (ii) 3.004 (iii) .0056.

Sol. (i) $0.75 = \frac{75}{100} = \frac{3}{4}$. (ii) $3.004 = \frac{3004}{1000} = \frac{751}{250}$. (iii) $.0056 = \frac{56}{10000} = \frac{7}{1250}$.

Ex. 2. *Arrange the fractions* $\frac{5}{8}, \frac{7}{12}, \frac{13}{16}, \frac{16}{29}$ *and* $\frac{3}{4}$ *in ascending order of magnitude.*

Sol. Converting each of the given fractions into decimal form, we get :

$\frac{5}{8} = 0.625$, $\frac{7}{12} = 0.5833$, $\frac{13}{16} = 0.8125$, $\frac{16}{29} = 0.5517$ and $\frac{3}{4} = 0.75$.

Now, $0.5517 < 0.5833 < 0.625 < 0.75 < 0.8125$.

$\therefore \quad \frac{16}{29} < \frac{7}{12} < \frac{5}{8} < \frac{3}{4} < \frac{13}{16}$.

Ex. 3. *Arrange the fractions* $\frac{3}{5}, \frac{4}{7}, \frac{8}{9}$ *and* $\frac{9}{11}$ *in their descending order.* (R.B.I. 2003)

Sol. Clearly, $\frac{3}{5} = 0.6$, $\frac{4}{7} = 0.571$, $\frac{8}{9} = 0.88$, $\frac{9}{11} = 0.818$.

Now, $0.88 > 0.818 > 0.6 > 0.571$.

$\therefore \quad \frac{8}{9} > \frac{9}{11} > \frac{3}{5} > \frac{4}{7}$.

Ex. 4. *Evaluate :* *(i) 6202.5 + 620.25 + 62.025 + 6.2025 + 0.62025* (L.I.C. 2003)
(ii) 5.064 + 3.98 + .7036 + 7.6 + .3 + 2

Sol. (i)
$$\begin{array}{r} 6202.5 \\ 620.25 \\ 62.025 \\ 6.2025 \\ + \quad 0.62025 \\ \hline 6891.59775 \end{array}$$

(ii)
$$\begin{array}{r} 5.064 \\ 3.98 \\ 0.7036 \\ 7.6 \\ 0.3 \\ + \quad 2.0 \\ \hline 19.6476 \end{array}$$

Ex. 5. *Evaluate :* *(i) 31.004 – 17.2386* *(ii) 13 – 5.1967*

Sol. (i)
$$\begin{array}{r} 31.0040 \\ - \ 17.2386 \\ \hline 13.7654 \end{array}$$

(ii)
$$\begin{array}{r} 13.0000 \\ - \ 5.1967 \\ \hline 7.8033 \end{array}$$

Ex. 6. *What value will replace the question mark in the following equations ?*
(i) 5172.49 + 378.352 + ? = 9318.678 (B.S.R.B. 1998)
(ii) ? – 7328.96 = 5169.38 (B.S.R.B. 2003)

Sol. (i) Let $5172.49 + 378.352 + x = 9318.678$.

Then, $x = 9318.678 - (5172.49 + 378.352) = 9318.678 - 5550.842 = 3767.836$.

(ii) Let $x - 7328.96 = 5169.38$. Then, $x = 5169.38 + 7328.96 = 12498.34$.

Ex. 7. *Find the products :* *(i) 6.3204 × 100* *(ii) .069 × 10000*

Sol. (i) $6.3204 \times 100 = 632.04$. (ii) $.069 \times 10000 = .0690 \times 10000 = 690$.

Ex. 8. ***Find the products :***

(i) 2.61 × 1.3 (ii) 2.1693 × 1.4 (iii) .4 × .04 × .004 × 40.

Sol. (*i*) 261 × 13 = 3393. Sum of decimal places of given numbers = (2 + 1) = 3.

∴ 2.61 × 1.3 = 3.393.

(*ii*) 21693 × 14 = 303702. Sum of decimal places = (4 + 1) = 5.

∴ 2.1693 × 1.4 = 3.03702.

(*iii*) 4 × 4 × 4 × 40 = 2560. Sum of decimal places = (1 + 2 + 3) = 6.

∴ .4 × .04 × .004 × 40 = .002560.

Ex. 9. ***Given that 268 × 74 = 19832, find the value of 2.68 × .74.***

Sol. Sum of decimal places = (2 + 2) = 4.

∴ 2.68 × .74 = 1.9832.

Ex. 10. ***Find the quotient :***

(i) 0.63 ÷ 9 (ii) 0.0204 ÷ 17 (iii) 3.1603 ÷ 13.

Sol. (*i*) 63 ÷ 9 = 7. Dividend contains 2 places of decimal.

∴ 0.63 ÷ 9 = .07.

(*ii*) 204 ÷ 17 = 12. Dividend contains 4 places of decimal.

∴ 0.0204 ÷ 17 = .0012.

(*iii*) 31603 ÷ 13 = 2431. Dividend contains 4 places of decimal.

∴ 3.1603 ÷ 13 = .2431.

Ex. 11. ***Evaluate :***

(i) 35 ÷ .07 (ii) 2.5 ÷ 0.0005 **(M.B.A. 1998)**

(iii) 136.09 ÷ 43.9 **(Hotel Management, 2000)**

Sol. (*i*) $\frac{35}{.07} = \frac{35 \times 100}{.07 \times 100} = \frac{3500}{7} = 500.$

(*ii*) $\frac{2.5}{0.0005} = \frac{2.5 \times 10000}{0.0005 \times 10000} = \frac{25000}{5} = 5000.$

(*iii*) $\frac{136.09}{43.9} = \frac{136.09 \times 10}{43.9 \times 10} = \frac{1360.9}{439} = 3.1.$

Ex. 12. ***What value will come in place of question mark in the following equations?***

(i) 0.006 ÷ ? = 0.6 (ii) ? ÷ .025 = 80

Sol. (*i*) Let $\frac{0.006}{x} = 0.6$. Then, $x = \frac{0.006}{0.6} = \frac{0.006 \times 10}{0.6 \times 10} = \frac{0.06}{6} = 0.01.$

(*ii*) Let $\frac{x}{.025} = 80$. Then, $x = 80 \times .025 = 2.$

Ex. 13. ***If*** $\frac{1}{3.718} = .2689$, ***then find the value of*** $\frac{1}{.0003718}$.

Sol. $\frac{1}{.0003718} = \frac{10000}{3.718} = \left(10000 \times \frac{1}{3.718}\right) = 10000 \times .2689 = 2689.$

Ex. 14. ***Express as vulgar fractions : (i) 0.37 (ii) 0.053 (iii) 3.142857.***

Sol. (*i*) $0.\overline{37} = \frac{37}{99}.$ (*ii*) $0.\overline{053} = \frac{53}{999}.$

(*iii*) $3.\overline{142857} = 3 + 0.\overline{142857} = 3 + \frac{142857}{999999} = 3\frac{142857}{999999}.$

Ex. 15. ***Express as vulgar fractions : (i) 0.1\overline{7} (ii) 0.12\overline{54} (iii) 2.5\overline{36}***

Sol. (*i*) $0.1\overline{7} = \frac{17 - 1}{90} = \frac{16}{90} = \frac{8}{45}.$ (*ii*) $0.12\overline{54} = \frac{1254 - 12}{9900} = \frac{1242}{9900} = \frac{69}{550}.$

(iii) $2.53\overline{6} = 2 + 0.53\overline{6} = 2 + \frac{536-53}{900} = 2 + \frac{483}{900} = 2 + \frac{161}{300} = 2\frac{161}{300}$.

Ex. 16. ***Simplify*** : $\frac{0.05 \times 0.05 \times 0.05 + 0.04 \times 0.04 \times 0.04}{0.05 \times 0.05 - 0.05 \times 0.04 + 0.04 \times 0.04}$. **(IGNOU, 2003)**

Sol. Given expression $= \left(\frac{a^3 + b^3}{a^2 - ab + b^2}\right)$, where $a = 0.05$, $b = 0.04$

$= (a + b) = (0.05 + 0.04) = 0.09$.

EXERCISE 3

(OBJECTIVE TYPE QUESTIONS)

Directions : *Mark (✓) against the correct answer* :

1. The fraction $101\frac{27}{100000}$ in decimal form is :

   (a) .01027 (b) .10127 (c) 101.00027 (d) 101.000027

2. When .36 is written in simplest fractional form, the sum of the numerator and the denominator is :

   (a) 15 (b) 45 (c) 114 (d) 135

3. What decimal of an hour is a second ?

   (a) .0025 (b) .0256 (c) .00027 (d) .000126

4. If $47.2506 = 4A + \frac{7}{B} + 2C + \frac{5}{D} + 6E$, then the value of 5A + 3B + 6C + D + 3E is : **(S.S.C. 2003)**

   (a) 53.6003 (b) 53.603 (c) 153.6003 (d) 213.0003

5. Which of the following has fractions in ascending order ? **(Bank P.O. 2003)**

   (a) $\frac{1}{3}, \frac{2}{5}, \frac{4}{7}, \frac{3}{5}, \frac{5}{6}, \frac{6}{7}$ (b) $\frac{1}{3}, \frac{2}{5}, \frac{3}{5}, \frac{4}{7}, \frac{5}{6}, \frac{6}{7}$

   (c) $\frac{1}{3}, \frac{2}{5}, \frac{3}{5}, \frac{5}{6}, \frac{4}{7}, \frac{6}{7}$ (d) $\frac{2}{5}, \frac{3}{5}, \frac{1}{3}, \frac{4}{7}, \frac{5}{6}, \frac{6}{7}$

6. Which of the following has fractions in ascending order ? **(NABARD, 2002)**

   (a) $\frac{2}{3}, \frac{3}{5}, \frac{7}{9}, \frac{9}{11}, \frac{8}{9}$ (b) $\frac{3}{5}, \frac{2}{3}, \frac{9}{11}, \frac{7}{9}, \frac{8}{9}$ (c) $\frac{3}{5}, \frac{2}{3}, \frac{7}{9}, \frac{9}{11}, \frac{8}{9}$

   (d) $\frac{8}{9}, \frac{9}{11}, \frac{7}{9}, \frac{2}{3}, \frac{3}{5}$ (e) $\frac{8}{9}, \frac{9}{11}, \frac{7}{9}, \frac{3}{5}, \frac{2}{3}$

7. Which of the following are in descending order of their value ? **(R.R.B. 2002)**

   (a) $\frac{5}{9}, \frac{7}{11}, \frac{8}{15}, \frac{11}{17}$ (b) $\frac{5}{9}, \frac{8}{15}, \frac{11}{17}, \frac{7}{11}$

   (c) $\frac{11}{17}, \frac{7}{11}, \frac{8}{15}, \frac{5}{9}$ (d) $\frac{11}{17}, \frac{7}{11}, \frac{5}{9}, \frac{8}{15}$

8. What is the difference between the biggest and the smallest fraction among $\frac{2}{3}, \frac{3}{4}, \frac{4}{5}$ and $\frac{5}{6}$? **(C.B.I. 1998)**

   (a) $\frac{1}{6}$ (b) $\frac{1}{12}$ (c) $\frac{1}{20}$ (d) $\frac{1}{30}$

9. Which part contains the fractions in ascending order ?
(a) $\frac{11}{14}, \frac{16}{19}, \frac{19}{21}$ (b) $\frac{16}{19}, \frac{11}{14}, \frac{19}{21}$ (c) $\frac{16}{19}, \frac{19}{21}, \frac{11}{14}$ (d) $\frac{19}{21}, \frac{11}{14}, \frac{16}{19}$

10. Which of the following fractions is the smallest ? **(S.S.C. 2002)**
(a) $\frac{13}{16}$ (b) $\frac{15}{19}$ (c) $\frac{17}{21}$ (d) $\frac{7}{8}$

11. Which of the following fractions is greater than $\frac{3}{4}$ and less than $\frac{5}{6}$? **(S.S.C. 1999)**
(a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{4}{5}$ (d) $\frac{9}{10}$

12. Which of the following fractions is less than $\frac{7}{8}$ and greater than $\frac{1}{3}$?
(a) $\frac{1}{4}$ (b) $\frac{23}{24}$ (c) $\frac{11}{12}$ (d) $\frac{17}{24}$

13. Which of the following numbers does not lie between $\frac{4}{5}$ and $\frac{7}{13}$?
(a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{3}{4}$ (d) $\frac{5}{7}$

14. The arrangement of rational numbers $\frac{-7}{10}, \frac{5}{-8}, \frac{2}{-3}$ in ascending order is :
(a) $\frac{2}{-3}, \frac{5}{-8}, \frac{-7}{10}$ (b) $\frac{5}{-8}, \frac{-7}{10}, \frac{2}{-3}$ (c) $\frac{-7}{10}, \frac{5}{-8}, \frac{2}{-3}$ (d) $\frac{-7}{10}, \frac{2}{-3}, \frac{5}{-8}$

15. 337.62 + 8.591 + 34.4 = ? **(S.S.C. 1998)**
(a) 370.611 (b) 380.511 (c) 380.611 (d) 426.97

16. The value of (1 + .1 + .01 + .001) is :
(a) 1.001 (b) 1.011 (c) 1.003 (d) 1.111

17. 34.95 + 240.016 + 23.98 = ? **(Bank P.O. 2002)**
(a) 298.0946 (b) 298.111 (c) 298.946 (d) 299.09

18. 617 + 6.017 + 0.617 + 6.0017 = ? **(M.B.A. 1998)**
(a) 6.2963 (b) 62.965 (c) 629.6357 (d) None of these

19. 48.95 – 32.006 = ? **(I.B.P.S. 2002)**
(a) 16.089 (b) 16.35 (c) 16.89 (d) 16.944

20. 792.02 + 101.32 – 306.76 = ? **(NABARD, 2002)**
(a) 586.58 (b) 893.34 (c) 997.11 (d) 1200.10

21. 12.1212 + 17.0005 – 9.1102 = ? **(B.S.R.B. 2003)**
(a) 20.0015 (b) 20.0105 (c) 20.0115 (d) 20.1015

22. 892.7 – 573.07 – 95.007 = ?
(a) 224.623 (b) 224.777 (c) 233.523 (d) 414.637

23. 3889 + 12.952 – ? = 3854.002 **(Bank P.O. 2002)**
(a) 47.095 (b) 47.752 (c) 47.932 (d) 47.95

24. 138.009 + 341.981 – 146.305 = 123.6 + ? **(Bank P.O. 1999)**
(a) 120.085 (b) 120.85 (c) 220.085 (d) None of these

25. 832.58 – 242.31 = 779.84 – ? **(B.S.R.B. 1998)**
(a) 179.57 (b) 199.57 (c) 295.05 (d) None of these

26. What will come in place of question mark in the following equation ?
54. (?) 3 + 543 + 5.43 = 603.26 **(Hotel Management, 2001)**
(a) 5 (b) 6 (c) 8 (d) None of these

27. Which of the following is equal to 3.14×10^6 ? **(Hotel Management, 2003)**
(a) 314 (b) 3140 (c) 3140000 (d) None of these

28. The number 518,000,000 when expressed in scientific notation, equals :
(a) 51.8×10^6 (b) 51.8×10^7 (c) 5.18×10^8 (d) 5.18×10^9

29. 0.000006723 when expressed in scientific notation, is :
(a) 6723×10^{-5} (b) 67.23×10^{-7} (c) 6.723×10^{-6} (d) None of these

30. If $1.125 \times 10^k = 0.001125$, then the value of k is :
(a) – 4 (b) – 3 (c) – 2 (d) – 1

31. $0.002 \times 0.5 = ?$ **(Bank P.O. 2003)**
(a) 0.0001 (b) 0.001 (c) 0.01 (d) 0.1

32. $16.02 \times 0.001 = ?$ **(Bank P.O. 2002)**
(a) 0.001602 (b) 0.01602 (c) 0.1602 (d) 1.6021

33. $0.014 \times 0.014 = ?$ **(Hotel Management, 2001)**
(a) 0.000196 (b) 0.00196 (c) 19.6 (d) 196

34. $40.83 \times 1.02 \times 1.2 = ?$ **(S.B.I.P.O. 2003)**
(a) 41.64660 (b) 42.479532 (c) 49.97592 (d) 58.7952

35. 0.04×0.0162 is equal to : **(M.B.A. 1998)**
(a) 6.48×10^{-3} (b) 6.48×10^{-4} (c) 6.48×10^{-5} (d) 6.48×10^{-6}

36. $3 \times 0.3 \times 0.03 \times 0.003 \times 30 = ?$ **(Hotel Management, 2002)**
(a) 0.0000243 (b) 0.000243 (c) 0.00243 (d) 0.0243

37. How many digits will be there to the right of the decimal point in the product of 95.75 and .02554 ? **(I.A.M. 2002)**
(a) 5 (b) 6 (c) 7 (d) None of these

38. $\left(.00625 \text{ of } \frac{23}{5}\right)$, when expressed as a vulgar fraction, equals :
(a) $\frac{23}{80}$ (b) $\frac{23}{800}$ (c) $\frac{23}{8000}$ (d) $\frac{125}{23}$

39. Which is the closest approximation to the product $0.3333 \times 0.25 \times 0.499 \times 0.125 \times 24$?
(a) $\frac{1}{8}$ (b) $\frac{3}{4}$ (c) $\frac{3}{8}$ (d) $\frac{2}{5}$

40. Consider the following quotients :
1. 368.39 divided by 17 2. 170.50 divided by 62 3. 875.65 divided by 83
Their correct sequence in decreasing order is : **(C.D.S. 2003)**
(a) 1, 3, 2 (b) 2, 1, 3 (c) 2, 3, 1 (d) 3, 1, 2

41. $0.213 + 0.00213 = ?$
(a) 1 (b) 10 (c) 100 (d) None of these

42. 4.036 divided by 0.04 gives : **(Hotel Management, 2003)**
(a) 1.009 (b) 10.09 (c) 100.9 (d) None of these

43. $\frac{1}{0.04}$ is equal to : **(S.S.C. 2000)**
(a) $\frac{1}{40}$ (b) $\frac{2}{5}$ (c) 2.5 (d) 25

44. $\left(\frac{0.05}{0.25}+\frac{0.25}{0.05}\right)^3 = ?$

(a) 139.4 (b) 140 (c) 140.6 (d) 143.9

45. The value of $0.0396 \div 2.51$ correct to 2 significant figures is :

(a) 0.015 (b) 0.0157 (c) 0.016 (d) 0.017

46. $.04 \times ? = .000016$.

(a) 0.0004 (b) 0.04 (c) 4 (d) None of these

47. $\frac{.009}{?} = .01$ **(M.B.A. 1998)**

(a) .0009 (b) .09 (c) .9 (d) 9

48. If $\frac{144}{0.144} = \frac{14.4}{x}$, then the value of x is : **(C.B.I. 2003)**

(a) 0.0144 (b) 1.44 (c) 14.4 (d) 144

49. A tailor has 37.5 metres of cloth and he has to make 8 pieces out of a metre of cloth. How many pieces can he make out of this cloth ? **(N.I.F.T. 2000)**

(a) 320 (b) 360 (c) 400 (d) None of these

50. The price of commodity X increases by 40 paise every year, while the price of commodity Y increases by 15 paise every year. If in 2001, the price of commodity X was Rs. 4.20 and that of Y was Rs. 6.30, in which year commodity X will cost 40 paise more than the commodity Y ? **(Bank P.O. 2002)**

(a) 2010 (b) 2011 (c) 2012 (d) 2013

51. When 0.232323 ..... is converted into a fraction, then the result is : **(C.B.I. 1998)**

(a) $\frac{1}{5}$ (b) $\frac{2}{9}$ (c) $\frac{23}{99}$ (d) $\frac{23}{100}$

52. The rational number for the recurring decimal 0.125125 ..... is : **(M.B.A. 2002)**

(a) $\frac{63}{487}$ (b) $\frac{119}{993}$ (c) $\frac{125}{999}$ (d) None of these

53. When $0.\overline{47}$ is converted into a fraction, the result is : **(Section Officers', 2003)**

(a) $\frac{46}{90}$ (b) $\frac{46}{99}$ (c) $\frac{47}{90}$ (d) $\frac{47}{99}$

54. $0.\overline{36}$ expressed in the form of $\frac{p}{q}$ equals :

(a) $\frac{4}{11}$ (b) $\frac{4}{13}$ (c) $\frac{35}{90}$ (d) $\frac{35}{99}$

55. The least among the following is : **(S.S.C. 2002)**

(a) 0.2 (b) $1 \div 0.2$ (c) $0.\overline{2}$ (d) $(0.2)^2$

56. The correct expression of $6.\overline{46}$ in the fractional form is : **(C.B.I. 1997)**

(a) $\frac{646}{99}$ (b) $\frac{64640}{1000}$ (c) $\frac{640}{100}$ (d) $\frac{640}{99}$

57. The value of $0.5\overline{7}$ is :

(a) $\frac{57}{10}$ (b) $\frac{57}{99}$ (c) $\frac{26}{45}$ (d) $\frac{52}{9}$

58. Let $F = 0.84\overline{181}$. When F is written as a fraction in lowest terms, the denominator exceeds the numerator by :

(a) 13 (b) 14 (c) 29 (d) 87

59. The value of $4.1\overline{2}$ is :

(a) $4\frac{11}{90}$ (b) $4\frac{11}{99}$ (c) $\frac{371}{900}$ (d) None of these

60. The value of $2.13\overline{6}$ is : **(L.I.C.A.A.O. 2003)**

(a) $\frac{47}{220}$ (b) $\frac{68}{495}$ (c) $2\frac{3}{22}$ (d) None of these

61. The value of $(0.\overline{2} + 0.\overline{3} + 0.\overline{4} + 0.\overline{9} + 0.\overline{39})$ is : **(C.B.I. 1997)**

(a) $0.\overline{57}$ (b) $1\frac{20}{33}$ (c) $2\frac{1}{3}$ (d) $2\frac{13}{33}$

62. $3.\overline{87} - 2.\overline{59} = ?$ **(A.A.O. Exam, 2003)**

(a) 1.20 (b) $1.\overline{2}$ (c) $1.\overline{27}$ (d) $1.\overline{28}$

63. The simplification of $3.\overline{36} - 2.\overline{05} + 1.\overline{33}$ equals : **(S.S.C. 2003)**

(a) 2.60 (b) 2.64 (c) $2.\overline{61}$ (d) $2.\overline{64}$

64. $(0.\overline{09} \times 7.\overline{3})$ is equal to : **(S.S.C. 2003)**

(a) $.\overline{6}$ (b) $.\overline{657}$ (c) $.\overline{67}$ (d) $.65\overline{7}$

65. $(0.3\overline{467} + 0.1\overline{333})$ is equal to : **(Hotel Management, 2002)**

(a) $0.4\overline{8}$ (b) $0.\overline{48}$ (c) $0.48\overline{01}$ (d) 0.48

66. $(8.3\overline{1} + 0.\overline{6} + 0.00\overline{2})$ is equal to : **(S.S.C. 2002)**

(a) $8.9\overline{12}$ (b) $8.\overline{912}$ (c) $8.9\overline{79}$ (d) $8.97\overline{9}$

67. The sum of $\overline{2}.75$ and $\overline{3}.78$ is : **(Section Officers', 2001)**

(a) $\overline{1}.03$ (b) $\overline{1}.53$ (c) $\overline{4}.53$ (d) $\overline{5}.53$

68. If $\frac{547.527}{0.0082} = x$, then the value of $\frac{547527}{82}$ is : **(Hotel Management, 1999)**

(a) $\frac{x}{10}$ (b) $10x$ (c) $100x$ (d) None of these

69. If $2994 \div 14.5 = 172$, then $29.94 \div 1.45 = ?$ **(L.I.C. 2003)**

(a) 0.172 (b) 1.72 (c) 17.2 (d) 172

70. If $213 \times 16 = 3408$, then 1.6×21.3 is equal to : **(Assistant Grade, 1998)**

(a) 0.3408 (b) 3.408 (c) 34.08 (d) 340.8

71. If $\frac{1}{6.198} = 0.16134$, then the value of $\frac{1}{0.0006198}$ is : **(S.S.C. 1997)**

(a) 0.016134 (b) 0.16134 (c) 1613.4 (d) 16134

72. When 52416 is divided by 312, the quotient is 168. What will be the quotient when 52.416 is divided by 0.0168 ? **(Hotel Management, 1998)**

(a) 3.12 (b) 312 (c) 3120 (d) None of these

73. Given $168 \times 32 = 5376$, then $5.376 \div 16.8$ is equal to :

(a) 0.032 (b) 0.32 (c) 3.2 (d) 32

74. $54.327 \times 357.2 \times 0.0057$ is the same as : **(Hotel Management, 1997)**

(a) $5.4327 \times 3.572 \times 5.7$ (b) $5.4327 \times 3.572 \times 0.57$

(c) $54327 \times 3572 \times 0.0000057$ (d) None of these

75. $\frac{5.3472 \times 324.23}{3.489 \times 5.42}$ is the same as :

(a) $\frac{53472 \times 3.2423}{3.489 \times 54.2}$ (b) $\frac{53472 \times 32423}{3489 \times 542}$ (c) $\frac{534.72 \times 324.23}{34.89 \times 5.42}$ (d) $\frac{53472 \times 3242.3}{3489 \times 542}$

76. $\frac{96.54-89.63}{96.54+89.63} \div \frac{965.4-896.3}{9.654+8.963} = ?$

(a) 10^{-2} (b) 10^{-1} (c) 10 (d) None of these

77. If $1^3 + 2^3 + ... + 9^3 = 2025$, then the value of $(0.11)^3 + (0.22)^3 + ... + (0.99)^3$ is close to : **(S.S.C. 2003)**

(a) 0.2695 (b) 0.3695 (c) 2.695 (d) 3.695

78. $8.7 - [7.6 - \{6.5 - (5.4 - \overline{4.3 - 2})\}]$ is simplified to : **(S.S.C. 2004)**

(a) 2.5 (b) 3.5 (c) 4.5 (d) 5.5

79. The value of $\frac{1}{4} + \frac{1}{4\times5} + \frac{1}{4\times5\times6}$ correct to 4 decimal places is :

(a) 0.3075 (b) 0.3082 (c) 0.3083 (d) 0.3085

80. Find the value of the following expression upto four places of decimals.

$$\left[1+\frac{1}{1\times2}+\frac{1}{1\times2\times4}+\frac{1}{1\times2\times4\times8}+\frac{1}{1\times2\times4\times8\times16}\right]$$ **(Hotel Management, 2002)**

(a) 1.6414 (b) 1.6415 (c) 1.6416 (d) 1.6428

81. The sum of the first 20 terms of the series $\frac{1}{5\times6} + \frac{1}{6\times7} + \frac{1}{7\times8} + ...$ is :

(a) 0.16 (b) 1.6 (c) 16 (d) None of these **(Hotel Management, 1998)**

82. If $1.5x = 0.04y$, then the value of $\left(\frac{y-x}{y+x}\right)$ is :

(a) $\frac{730}{77}$ (b) $\frac{73}{77}$ (c) $\frac{7.3}{77}$ (d) None of these

83. The value of $\left[35.7 - \left(3+\frac{1}{3+\frac{1}{3}}\right) - \left(2+\frac{1}{2+\frac{1}{2}}\right)\right]$ is :

(a) 30 (b) 34.8 (c) 36.6 (d) 41.4

84. $\frac{(0.1667)(0.8333)(0.3333)}{(0.2222)(0.6667)(0.1250)}$ is approximately equal to : **(M.B.A. 1998)**

(a) 2 (b) 2.40 (c) 2.43 (d) 2.50

85. The value of $\frac{3.6\times0.48\times2.50}{0.12\times0.09\times0.5}$ is : **(S.S.C. 1998)**

(a) 80 (b) 800 (c) 8000 (d) 80000

86. $\frac{0.0203\times2.92}{0.0073\times14.5\times0.7} = ?$ **(R.R.B. 1998)**

(a) 0.8 (b) 1.45 (c) 2.40 (d) 3.25

87. The value of $\frac{3.157\times4126\times3.198}{63.972\times2835.121}$ is closest to : **(C.B.I. 2003)**

(a) 0.002 (b) 0.02 (c) 0.2 (d) 2

88. The value of $\frac{489.1375\times0.0483\times1.956}{0.0873\times92.581\times99.749}$ is closest to : **(C.B.I. 1997)**

(a) 0.006 (b) 0.06 (c) 0.6 (d) 6

89. The value of $\frac{241.6\times0.3814\times6.842}{0.4618\times38.25\times73.65}$ is close to :

(a) 0.2 (b) 0.4 (c) 0.6 (d) 1

90. $(0.2 \times 0.2 + 0.01)\,(0.1 \times 0.1 + 0.02)^{-1}$ is equal to : **(Section Officers', 2003)**

(a) $\frac{5}{3}$ (b) $\frac{9}{5}$ (c) $\frac{41}{4}$ (d) $\frac{41}{12}$

91. $\frac{5 \times 1.6 - 2 \times 1.4}{1.3} = ?$ **(Bank P.O. 2003)**

(a) 0.4 (b) 1.2 (c) 1.4 (d) 4

92. The value of $(4.7 \times 13.26 + 4.7 \times 9.43 + 4.7 \times 77.31)$ is : **(IGNOU, 2003)**

(a) 0.47 (b) 47 (c) 470 (d) 4700

93. Simplify : $\frac{0.2 \times 0.2 + 0.2 \times 0.02}{0.044}$. **(S.S.C. 1999)**

(a) 0.004 (b) 0.4 (c) 1 (d) 2

94. The value of $\left(\frac{8.6 \times 5.3 + 8.6 \times 4.7}{4.3 \times 9.7 - 4.3 \times 8.7}\right)$ is :

(a) 3.3 (b) 6.847 (c) 13.9 (d) 20

95. The value of $\left(\frac{.896 \times .763 + .896 \times .237}{.7 \times .064 + .7 \times .936}\right)$ is :

(a) .976 (b) 9.76 (c) 1.28 (d) 12.8

96. The value of $(68.237)^2 - (31.763)^2$ is :

(a) 3.6474 (b) 36.474 (c) 364.74 (d) 3647.4

97. Evaluate : $\frac{(2.39)^2 - (1.61)^2}{2.39 - 1.61}$. **(R.R.B. 2003)**

(a) 2 (b) 4 (c) 6 (d) 8

98. On simplification of $\frac{(2.644)^2 - (2.356)^2}{0.288}$, we get : **(S.S.C. 1999)**

(a) 1 (b) 4 (c) 5 (d) 6

99. $\frac{(36.54)^2 - (3.46)^2}{?} = 40.$

(a) 3.308 (b) 4 (c) 33.08 (d) 330.8

100. The value of $\frac{(67.542)^2 - (32.458)^2}{75.458 - 40.374}$ is : **(Hotel Management, 1997)**

(a) 1 (b) 10 (c) 100 (d) None of these

101. $\left(\frac{1.49 \times 14.9 - 0.51 \times 5.1}{14.9 - 5.1}\right)$ is equal to : **(S.S.C. 2004)**

(a) 0.20 (b) 2.00 (c) 20 (d) 22

102. $\frac{4.2 \times 4.2 - 1.9 \times 1.9}{2.3 \times 6.1} = ?$ **(R.R.B. 1998)**

(a) 0.5 (b) 1 (c) 1.9 (d) 4.2

103. Simplify : $\frac{5.32 \times 56 + 5.32 \times 44}{(7.66)^2 - (2.34)^2}$.

(a) 7.2 (b) 8.5 (c) 10 (d) 12

104. $\frac{(0.6)^4 - (0.5)^4}{(0.6)^2 + (0.5)^2}$ is equal to :

(a) 0.1 (b) 0.11 (c) 1.1 (d) 11

105. $(7.5 \times 7.5 + 37.5 + 2.5 \times 2.5)$ is equal to : **(S.S.C. 2000)**

(a) 30 (b) 60 (c) 80 (d) 100

106. The simplification of $\frac{0.2 \times 0.2 + 0.02 \times 0.02 - 0.4 \times 0.02}{0.36}$ gives :

(a) 0.009 (b) 0.09 (c) 0.9 (d) 9

107. The expression $(11.98 \times 11.98 + 11.98 \times x + 0.02 \times 0.02)$ will be a perfect square for x equal to :

(a) 0.02 (b) 0.2 (c) 0.04 (d) 0.4

108. 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 :

(a) 0.5 (b) 2 (c) 2.199 (d) 3.195

109. The value of $\frac{(0.137 + 0.098)^2 - (0.137 - 0.098)^2}{0.137 \times 0.098}$ is :

(a) 0.039 (b) 0.235 (c) 0.25 (d) 4

110. The value of $\left(\frac{0.051 \times 0.051 \times 0.051 + 0.041 \times 0.041 \times 0.041}{0.051 \times 0.051 - 0.051 \times 0.041 + 0.041 \times 0.041}\right)$ is : **(S.S.C. 2003)**

(a) 0.00092 (b) 0.0092 (c) 0.092 (d) 0.92

111. The value of $\left(\frac{.953 \times .953 - .953 \times .047 + .047 \times .047}{.953 \times .953 \times .953 + .047 \times .047 \times .047}\right)$ is :

(a) .32 (b) .886 (c) 1.1286 (d) None of these

112. The value of $\left(\frac{0.125 + 0.027}{0.5 \times 0.5 + 0.09 - 0.15}\right)$ is : **(S.S.C. 2002)**

(a) 0.08 (b) 0.2 (c) 0.8 (d) 1

113. $\left(\frac{10.3 \times 10.3 \times 10.3 + 1}{10.3 \times 10.3 - 10.3 + 1}\right)$ is equal to : **(S.S.C. 2004)**

(a) 9.3 (b) 10.3 (c) 11.3 (d) 12.3

114. $\left[\frac{8(3.75)^3 + 1}{(7.5)^2 - 6.5}\right]$ is equal to : **(S.S.C. 2003)**

(a) $\frac{9}{5}$ (b) 2.75 (c) 4.75 (d) 8.5

115. The value of $\left(\frac{0.1 \times 0.1 \times 0.1 + 0.02 \times 0.02 \times 0.02}{0.2 \times 0.2 \times 0.2 + 0.04 \times 0.04 \times 0.04}\right)$ is : **(Hotel Management, 2003)**

(a) 0.0125 (b) 0.125 (c) 0.25 (d) 0.5

116. The value of $\left(\frac{8.94 \times 8.94 \times 8.94 - 3.56 \times 3.56 \times 3.56}{8.94 \times 8.94 + 8.94 \times 3.56 + 3.56 \times 3.56}\right)$ is :

(a) 0.538 (b) 5.38 (c) 0.0538 (d) 53.8

117. The value of $\frac{(0.96)^3 - (0.1)^3}{(0.96)^2 + 0.096 + (0.1)^2}$ is : **(S.S.C. 2004)**

(a) 0.86 (b) 0.95 (c) 0.97 (d) 1.06

118. The value of $\frac{(2.3)^3 - .027}{(2.3)^2 + .69 + .09}$ is : **(S.S.C. 1997)**

(a) 0 (b) 1.6 (c) 2 (d) 3.4

119. The value of $\frac{(0.06)^2 + (0.47)^2 + (0.079)^2}{(0.006)^2 + (0.047)^2 + (0.0079)^2}$ is :

(a) 0.1 (b) 10 (c) 100 (d) 1000

ANSWERS

1. (c)	2. (a)	3. (c)	4. (c)	5. (a)	6. (c)	7. (d)	8. (a)	9. (a)
10. (b)	11. (c)	12. (d)	13. (a)	14. (d)	15. (c)	16. (d)	17. (c)	18. (c)
19. (d)	20. (a)	21. (c)	22. (a)	23. (d)	24. (d)	25. (d)	26. (c)	27. (c)
28. (c)	29. (c)	30. (b)	31. (b)	32. (b)	33. (a)	34. (c)	35. (b)	36. (c)
37. (b)	38. (b)	39. (a)	40. (a)	41. (c)	42. (c)	43. (d)	44. (c)	45. (c)
46. (a)	47. (c)	48. (a)	49. (d)	50. (b)	51. (c)	52. (c)	53. (d)	54. (a)
55. (d)	56. (d)	57. (c)	58. (d)	59. (a)	60. (c)	61. (d)	62. (d)	63. (d)
64. (a)	65. (c)	66. (d)	67. (c)	68. (a)	69. (c)	70. (c)	71. (c)	72. (c)
73. (b)	74. (a)	75. (d)	76. (a)	77. (c)	78. (c)	79. (c)	80. (c)	81. (a)
82. (b)	83. (a)	84. (d)	85. (b)	86. (a)	87. (c)	88. (b)	89. (b)	90. (a)
91. (d)	92. (c)	93. (c)	94. (d)	95. (c)	96. (d)	97. (b)	98. (c)	99. (c)
100. (c)	101. (b)	102. (b)	103. (c)	104. (b)	105. (d)	106. (b)	107. (c)	108. (b)
109. (d)	110. (c)	111. (d)	112. (c)	113. (c)	114. (d)	115. (b)	116. (b)	117. (a)
118. (c)	119. (c)							

SOLUTIONS

1. $101\frac{27}{100000} = 101 + \frac{27}{100000} = 101 + .00027 = 101.00027.$

2. $0.36 = \frac{36}{100} = \frac{9}{25}$. Sum of Numerator and Denominator = 9 + 25 = 34.

3. Required decimal $= \frac{1}{60 \times 60} = \frac{1}{3600} = .00027.$

4. $4A + \frac{7}{B} + 2C + \frac{5}{D} + 6E = 47.2506$

$\Rightarrow \quad 4A + \frac{7}{B} + 2C + \frac{5}{D} + 6E = 40 + 7 + 0.2 + 0.05 + 0.0006$

Comparing the terms on both sides, we get :

$4A = 40, \frac{7}{B} = 7, 2C = 0.2, \frac{5}{D} = 0.05, 6E = 0.0006$

or $A = 10, B = 1, C = 0.1, D = 100, E = 0.0001.$

$\therefore \quad 5A + 3B + 6C + D + 3E = (5 \times 10) + (3 \times 1) + (6 \times 0.1) + 100 + (3 \times 0.0001)$

$= 50 + 3 + 0.6 + 100 + 0.0003 = 153.6003.$

5. Converting each of the given fractions into decimal form, we get :

$\frac{1}{3} = 0.33, \frac{2}{5} = 0.4, \frac{4}{7} = 0.57, \frac{3}{5} = 0.6, \frac{5}{6} = 0.82, \frac{6}{7} = 0.857.$

Clearly, $0.33 < 0.4 < 0.57 < 0.6 < 0.82 < 0.857$. So, $\frac{1}{3} < \frac{2}{5} < \frac{4}{7} < \frac{3}{5} < \frac{5}{6} < \frac{6}{7}$.

6. Converting each of the given fractions into decimal form, we get :

$\frac{2}{3} = 0.66, \frac{3}{5} = 0.6, \frac{7}{9} = 0.77, \frac{9}{11} = 0.81, \frac{8}{9} = 0.88.$

Clearly, $0.6 < 0.66 < 0.77 < 0.81 < 0.88$. So, $\frac{3}{5} < \frac{2}{3} < \frac{7}{9} < \frac{9}{11} < \frac{8}{9}$.

7. Converting each of the given fractions into decimal form, we get :

$\frac{5}{9} = 0.55,\ \frac{7}{11} = 0.63,\ \frac{8}{15} = 0.533,\ \frac{11}{17} = 0.647.$

Clearly, $0.647 > 0.63 > 0.55 > 0.533$. So, $\frac{11}{17} > \frac{7}{11} > \frac{5}{9} > \frac{8}{15}$.

8. Converting each of the given fractions into decimal form, we get :

$\frac{2}{3} = 0.66,\ \frac{3}{4} = 0.75,\ \frac{4}{5} = 0.8,\ \frac{5}{6} = 0.833.$

Since $0.833 > 0.8 > 0.75 > 0.66$, so $\frac{5}{6} > \frac{4}{5} > \frac{3}{4} > \frac{2}{3}$.

$\therefore$ Required difference $= \left(\frac{5}{6} - \frac{2}{3}\right) = \frac{1}{6}$.

9. Clearly, $\frac{11}{14} = 0.785,\ \frac{16}{19} = 0.842,\ \frac{19}{21} = 0.904.$

Now, $0.785 < 0.842 < 0.904$. So, $\frac{11}{14} < \frac{16}{19} < \frac{19}{21}$.

10. We have : $\frac{13}{16} = 0.8125,\ \frac{15}{19} = 0.7894,\ \frac{17}{21} = 0.8095$ and $\frac{7}{8} = 0.875$.

Since 0.7894 is the smallest, so $\frac{15}{19}$ is the smallest.

11. $\frac{3}{4} = 0.75,\ \frac{5}{6} = 0.833,\ \frac{1}{2} = 0.5,\ \frac{2}{3} = 0.66,\ \frac{4}{5} = 0.8,\ \frac{9}{10} = 0.9.$

Clearly, 0.8 lies between 0.75 and 0.833.

$\therefore$ $\frac{4}{5}$ lies between $\frac{3}{4}$ and $\frac{5}{6}$.

12. $\frac{7}{8} = 0.875,\ \frac{1}{3} = 0.333,\ \frac{1}{4} = 0.25,\ \frac{23}{24} = 0.958,\ \frac{11}{12} = 0.916,\ \frac{17}{24} = 0.708.$

Clearly, 0.708 lies between 0.333 and 0.875.

$\therefore$ $\frac{17}{24}$ lies between $\frac{1}{3}$ and $\frac{7}{8}$.

13. $\frac{4}{5} = 0.8,\ \frac{7}{13} = 0.53,\ \frac{1}{2} = 0.5,\ \frac{2}{3} = 0.66,\ \frac{3}{4} = 0.75,\ \frac{5}{7} = 0.714.$

Clearly, 0.5 does not lie between 0.53 and 0.8.

$\therefore$ $\frac{1}{2}$ does not lie between $\frac{4}{5}$ and $\frac{7}{13}$.

14. $\frac{-7}{10} = -0.7,\ \frac{5}{-8} = -\frac{5}{8} = -0.625,\ \frac{2}{-3} = -\frac{2}{3} = -0.66.$

Since $-0.7 < -0.66 < -0.625$, so $\frac{-7}{10} < \frac{2}{-3} < \frac{5}{-8}$.

15.
$$\begin{array}{r} 337.62 \\ 8.591 \\ +\ 34.4 \\ \hline 380.611 \end{array}$$

16.
$$\begin{array}{r} 1.0 \\ 0.1 \\ 0.01 \\ +\ 0.001 \\ \hline 1.111 \end{array}$$

17.
$$\begin{array}{r} 34.95 \\ 240.016 \\ +\ 23.98 \\ \hline 298.946 \end{array}$$

18.
$$\begin{array}{r} 617.00 \\ 6.017 \\ 0.617 \\ +\ 6.0017 \\ \hline 629.6357 \end{array}$$

19. $\begin{array}{r} 48.950 \\ -\ 32.006 \\ \hline 16.944 \end{array}$ **20.** $\begin{array}{r} 792.02 \\ +\ 101.32 \\ \hline 893.34 \end{array}$ $\begin{array}{r} 893.34 \\ -\ 306.76 \\ \hline 586.58 \end{array}$

21. Given expression = $(12.1212 + 17.0005) - 9.1102 = (29.1217 - 9.1102) = 20.0115$.

22. Given expression = $892.7 - (573.07 + 95.007) = 892.7 - 668.077 = 224.623$.

23. Let $3889 + 12.952 - x = 3854.002$.

Then, $x = (3889 + 12.952) - 3854.002 = 3901.952 - 3854.002 = 47.95$.

24. Let $138.009 + 341.981 - 146.305 = 123.6 + x$.

Then, $x = (138.009 + 341.981) - (146.305 + 123.6) = 479.99 - 269.905 = 210.085$.

25. Let $832.58 - 242.31 = 779.84 - x$.

Then, $x = (779.84 + 242.31) - 832.58 = 1022.15 - 832.58 = 189.57$.

26. Let $x + 543 + 5.43 = 603.26$. Then, $x = 603.26 - (543 + 5.43) = 603.26 - 548.43 = 54.83$.

$\therefore$ Missing digit = 8.

27. $3.14 \times 10^6 = 3.140000 \times 1000000 = 3140000$.

28. $518{,}000{,}000 = 5.18 \times 100000000 = 5.18 \times 10^8$.

29. $0.000006723 = \dfrac{0.000006723 \times 10^6}{10^6} = \dfrac{6.723}{10^6} = 6.723 \times 10^{-6}$.

30. $10^k = \dfrac{0.001125}{1.125} = \dfrac{1.125}{1125} = \dfrac{1.125 \times 10^3}{1125 \times 10^3} = \dfrac{1}{10^3} = 10^{-3}$.

$\therefore$ $k = -3$.

31. $2 \times 5 = 10$. Sum of decimal places = 4.

$\therefore$ $0.002 \times 0.5 = 0.0010 = 0.001$.

32. $1602 \times 1 = 1602$. Sum of decimal places = 5.

$\therefore$ $16.02 \times 0.001 = 0.01602$.

33. $14 \times 14 = 196$. Sum of decimal places = 6.

$\therefore$ $0.014 \times 0.014 = 0.000196$.

34. $4083 \times 102 \times 12 = 4997592$. Sum of decimal places = 5.

$\therefore$ $40.83 \times 1.02 \times 1.2 = 49.97592$.

35. $4 \times 162 = 648$. Sum of decimal places = 6.

$\therefore$ $0.04 \times 0.0162 = 0.000648 = 6.48 \times 10^{-4}$.

36. $3 \times 3 \times 3 \times 3 \times 30 = 2430$. Sum of decimal places = 6.

$\therefore$ $3 \times 0.3 \times 0.03 \times 0.003 \times 30 = 0.002430 = 0.00243$.

37. Sum of decimal places = 7.

Since the last digit to the extreme right will be zero ($\because$ $5 \times 4 = 20$), so there will be 6 significant digits to the right of the decimal point.

38. $\left(.00625 \text{ of } \dfrac{23}{5}\right) = \left(\dfrac{625}{100000} \times \dfrac{23}{5}\right) = \dfrac{23}{800}$.

39. Given product $= 0.3 \times 0.25 \times 0.5 \times 0.125 \times 24$

$$= \left(\frac{3}{10} \times \frac{25}{100} \times \frac{5}{10} \times \frac{125}{1000} \times 24\right) = \frac{9}{80} = \frac{1}{8} \text{ (App.)}$$

40. 1. $36839 \div 17 = 2167$. Dividend contains 2 places of decimal.

$\therefore$ $368.39 \div 17 = 21.67$.

2. $17050 \div 62 = 275$. Dividend contains 2 places of decimal.

$\therefore$ $170.50 \div 62 = 2.75$.

3. $87565 \div 83 = 1055$. Dividend contains 2 places of decimal.

$\therefore\ 875.65 \div 83 = 10.55$.

Since $21.67 > 10.55 > 2.75$, the desired order is 1, 3, 2.

41. $\dfrac{0.213}{0.00213} = \dfrac{0.213 \times 100000}{0.00213 \times 100000} = \dfrac{213 \times 100}{213} = 100.$

42. $\dfrac{4.036}{0.04} = \dfrac{403.6}{4} = 100.9.$

43. $\dfrac{1}{0.04} = \dfrac{100}{4} = 25.$

44. $\left(\dfrac{0.05}{0.25} + \dfrac{0.25}{0.05}\right)^3 = \left(\dfrac{5}{25} + \dfrac{25}{5}\right)^3 = \left(\dfrac{1}{5} + 5\right)^3 = \left(\dfrac{26}{5}\right)^3 = (5.2)^3 = 140.608.$

45. $\dfrac{0.0396}{2.51} = \dfrac{3.96}{251} = \left(\dfrac{396}{251 \times 100}\right) = \dfrac{1.577}{100} = 0.01577 = 0.016.$

46. Let $.04 \times x = .000016$. Then, $x = \dfrac{.000016}{.04} = \dfrac{.0016}{4} = .0004.$

47. Let $\dfrac{.009}{x} = .01$. Then, $x = \dfrac{.009}{.01} = \dfrac{.9}{1} = .9.$

48. $\dfrac{144}{0.144} = \dfrac{14.4}{x} \Leftrightarrow \dfrac{144 \times 1000}{144} = \dfrac{14.4}{x} \Leftrightarrow x = \dfrac{14.4}{1000} = 0.0144.$

49. Length of each piece $= \left(\dfrac{1}{8}\right)$ m $= 0.125$ m.

$\therefore$ Required number of pieces $= \left(\dfrac{37.5}{0.125}\right) = \left(\dfrac{375 \times 100}{125}\right) = 300.$

50. Suppose commodity X will cost 40 paise more than Y after z years. Then,

$(4.20 + 0.40z) - (6.20 + 0.15z) = 0.40$

$\Leftrightarrow\ 0.25z = 0.40 + 2.10 \Leftrightarrow z = \dfrac{2.50}{0.25} = \dfrac{250}{25} = 10.$

$\therefore$ X will cost 40 paise more than Y 10 years after 2001 *i.e.*, in 2011.

51. $0.232323\ldots\ldots = 0.\overline{23} = \dfrac{23}{99}.$

52. $0.125125\ldots\ldots = 0.\overline{125} = \dfrac{125}{999}.$

53. $0.\overline{47} = \dfrac{47}{99}.$

54. $0.\overline{36} = \dfrac{36}{99} = \dfrac{4}{11}.$

55. $1 \div 0.2 = \dfrac{1}{0.2} = \dfrac{10}{2} = 5;\ 0.\overline{2} = 0.222\ldots\ldots;\ (0.2)^2 = 0.04.$

$0.04 < 0.2 < 0.22\ldots\ldots < 5.$

Since 0.04 is the least, so $(0.2)^2$ is the least.

56. $6.\overline{46} = 6 + 0.\overline{46} = 6 + \dfrac{46}{99} = \dfrac{594 + 46}{99} = \dfrac{640}{99}.$

57. $0.5\overline{7} = \dfrac{57 - 5}{90} = \dfrac{52}{90} = \dfrac{26}{45}.$

58. $0.84\overline{181} = \dfrac{84181 - 841}{99000} = \dfrac{83340}{99000} = \dfrac{463}{550}.$

$\therefore$ Required difference $= (550 - 463) = 87.$

59. $4.1\overline{2} = 4 + 0.1\overline{2} = 4 + \frac{12-1}{90} = 4\frac{11}{90}$.

60. $2.1\overline{36} = 2 + 0.1\overline{36} = 2 + \frac{136-1}{990} = 2 + \frac{3}{22} = 2\frac{3}{22}$.

61. $0.\overline{2} + 0.\overline{3} + 0.\overline{4} + 0.\overline{9} + 0.\overline{39} = \left(\frac{2}{9} + \frac{3}{9} + \frac{4}{9} + \frac{9}{9} + \frac{39}{99}\right) = \left(\frac{9}{9} + \frac{9}{9} + \frac{39}{99}\right) = 2 + \frac{13}{33} = 2\frac{13}{33}$.

62. $3.\overline{87} - 2.\overline{59} = (3 + 0.\overline{87}) - (2 + 0.\overline{59}) = \left(3 + \frac{87}{99}\right) - \left(2 + \frac{59}{99}\right) = 1 + \left(\frac{87}{99} - \frac{59}{99}\right)$

$= 1 + \frac{28}{99} = 1.\overline{28}$.

63. $3.\overline{36} - 2.\overline{05} + 1.\overline{33} = [(3 + 0.\overline{36}) + (1 + 0.\overline{33})] - (2 + 0.\overline{05})$

$= \left[4 + \left(\frac{36}{99} + \frac{33}{99}\right)\right] - \left[2 + \frac{5}{99}\right] = 2 + \left(\frac{36}{99} + \frac{33}{99} - \frac{5}{99}\right) = 2 + \frac{64}{99} = 2.\overline{64}$.

64. $0.\overline{09} \times 7.\overline{3} = \frac{9}{99} \times 7\frac{3}{9} = \frac{1}{11} \times \frac{66}{9} = \frac{2}{3} = 0.\overline{6}$.

65. $0.3\overline{467} + 0.1\overline{333} = \frac{3467-34}{9900} + \frac{1333-13}{9900} = \frac{3433+1320}{9900} = \frac{4753}{9900} = \frac{4801-48}{9900} = 0.48\overline{01}$.

66. $(8.3\overline{1} + 0.\overline{6} + 0.00\overline{2}) = 8 + \frac{31-3}{90} + \frac{6}{9} + \frac{2}{900} = \frac{7200+280+600+2}{900}$

$= \frac{8082}{900} = 8\frac{882}{900} = 8 + \frac{979-97}{900} = 8.97\overline{9}$.

67. $\overline{2}.75 + \overline{3}.78 = (-2 + 0.75) + (-3 + 0.78) = -5 + (0.75 + 0.78) = -5 + 1.53$

$= -5 + 1 + 0.53 = -4 + 0.53 = \overline{4}.53$.

68. $\frac{547527}{82} = \frac{54.7527}{0.0082} = \left(\frac{547.527}{0.0082} \times \frac{1}{10}\right) = \frac{x}{10}$.

69. $\frac{29.94}{1.45} = \frac{299.4}{14.5} = \left(\frac{2994}{14.5} \times \frac{1}{10}\right) = \frac{172}{10} = 17.2$.

70. $1.6 \times 21.3 = \left(\frac{16}{10} \times \frac{213}{10}\right) = \left(\frac{16 \times 213}{100}\right) = \frac{3408}{100} = 34.08$.

71. $\frac{1}{0.0006198} = \frac{10000}{6.198} = \left(10000 \times \frac{1}{6.198}\right) = (10000 \times 0.16134) = 1613.4$.

72. Given, $\frac{52416}{312} = 168 \Leftrightarrow \frac{52416}{168} = 312$.

Now, $\frac{52.416}{0.0168} = \frac{524160}{168} = \left(\frac{52416}{168} \times 10\right) = (312 \times 10) = 3120$.

73. Given, $168 \times 32 = 5376$ or $5376 \div 168 = 32$.

Now, $\frac{5.376}{16.8} = \frac{53.76}{168} = \left(\frac{5376}{168} \times \frac{1}{100}\right) = \frac{32}{100} = 0.32$.

74. Number of decimal places in the given expression = 8.
Number of decimal places in (a) = 8.
Number of decimal places in (b) = 9.
Number of decimal places in (c) = 7.
Clearly, the expression in (a) is the same as the given expression.

75. For the expressions to be equivalent, the difference between the sum of the decimal places in the numerator and that in the denominator must be equal.
This difference is 1 in the given expression and 1 in (d). So, (d) is the answer.

76. Given expression $= \dfrac{(96.54 - 89.63)}{(96.54 + 89.63)} \times \dfrac{(9.654 + 8.963)}{(965.4 - 896.3)} = \dfrac{(96.54 - 89.63)}{(965.4 - 896.3)} \times \dfrac{(9.654 + 8.963)}{(96.54 + 89.63)}$

$= \dfrac{(96.54 - 89.63)}{10\,(96.54 - 89.63)} \times \dfrac{(96.54 + 89.63)}{10\,(96.54 + 89.63)}$

$= \dfrac{1}{10} \times \dfrac{1}{10} = \dfrac{1}{100} = \dfrac{1}{10^2} = 10^{-2}.$

77. $(0.11)^3 + (0.22)^3 + \ldots\ldots + (0.99)^3 = (0.11)^3\,(1^3 + 2^3 + \ldots\ldots + 9^3)$

$= 0.001331 \times 2025 = 2.695275 \simeq 2.695.$

78. Given expression $= 8.7 - [7.6 - \{6.5 - (5.4 - 2.3)\}] = 8.7 - [7.6 - (6.5 - 3.1)]$

$= 8.7 - (7.6 - 3.4) = 8.7 - 4.2 = 4.5.$

79. $\dfrac{1}{4} + \dfrac{1}{4 \times 5} + \dfrac{1}{4 \times 5 \times 6} = \dfrac{1}{4}\left(1 + \dfrac{1}{5} + \dfrac{1}{30}\right) = \dfrac{1}{4}\left(\dfrac{30 + 6 + 1}{30}\right) = \dfrac{1}{4} \times \dfrac{37}{30} = \dfrac{37}{120} = 0.3083.$

80. Given expression $= \dfrac{2 \times 4 \times 8 \times 16 + 4 \times 8 \times 16 + 8 \times 16 + 16 + 1}{2 \times 4 \times 8 \times 16}$

$= \dfrac{1024 + 512 + 128 + 16 + 1}{1024} = \dfrac{1681}{1024} = 1.6416.$

81. Given expression $= \dfrac{1}{5 \times 6} + \dfrac{1}{6 \times 7} + \dfrac{1}{7 \times 8} + \ldots\ldots + \dfrac{1}{24 \times 25}$

$= \left(\dfrac{1}{5} - \dfrac{1}{6}\right) + \left(\dfrac{1}{6} - \dfrac{1}{7}\right) + \left(\dfrac{1}{7} - \dfrac{1}{8}\right) + \ldots\ldots + \left(\dfrac{1}{24} - \dfrac{1}{25}\right)$

$= \left(\dfrac{1}{5} - \dfrac{1}{25}\right) = \dfrac{4}{25} = 0.16.$

82. $\dfrac{x}{y} = \dfrac{0.04}{1.5} = \dfrac{4}{150} = \dfrac{2}{75} \Rightarrow \dfrac{y - x}{y + x} = \dfrac{1 - \dfrac{x}{y}}{1 + \dfrac{x}{y}} = \dfrac{1 - \dfrac{2}{75}}{1 + \dfrac{2}{75}} = \dfrac{73}{77}.$

83. Given expression $= 35.7 - \left(3 + \dfrac{1}{\frac{10}{3}}\right) - \left(2 + \dfrac{1}{\frac{5}{2}}\right) = 35.7 - \left(3 + \dfrac{3}{10}\right) - \left(2 + \dfrac{2}{5}\right)$

$= 35.7 - \dfrac{33}{10} - \dfrac{12}{5} = 35.7 - \left(\dfrac{33}{10} + \dfrac{12}{5}\right) = 35.7 - \dfrac{57}{10} = 35.7 - 5.7 = 30.$

84. Given expression $= \dfrac{(0.3333)}{(0.2222)} \times \dfrac{(0.1667)\,(0.8333)}{(0.6667)\,(0.1250)} = \dfrac{3333}{2222} \times \dfrac{\frac{1}{6} \times \frac{5}{6}}{\frac{2}{3} \times \frac{125}{1000}}$

$= \left(\dfrac{3}{2} \times \dfrac{1}{6} \times \dfrac{5}{6} \times \dfrac{3}{2} \times 8\right) = \dfrac{5}{2} = 2.50.$

85. $\dfrac{3.6 \times 0.48 \times 2.50}{0.12 \times 0.09 \times 0.5} = \dfrac{36 \times 48 \times 250}{12 \times 9 \times 5} = 800.$

86. $\dfrac{0.0203 \times 2.92}{0.0073 \times 14.5 \times 0.7} = \dfrac{203 \times 292}{73 \times 145 \times 7} = \dfrac{4}{5} = 0.8.$

87. $\dfrac{3.157\times4126\times3.198}{63.972\times2835.121}=\dfrac{3.2\times4126\times3.2}{64\times2835}=\dfrac{32\times4126\times32}{64\times2835}\times\dfrac{1}{100}$

$=\dfrac{66016}{2835}\times\dfrac{1}{100}=\dfrac{23.28}{100}=0.23\approx0.2.$

88. $\dfrac{489.1375\times0.0483\times1.956}{0.0873\times92.581\times99.749}=\dfrac{489\times0.05\times2}{0.09\times93\times100}=\dfrac{489}{9\times93\times10}$

$=\dfrac{163}{279}\times\dfrac{1}{10}=\dfrac{0.58}{10}=0.058\approx0.06.$

89. $\dfrac{241.6\times0.3814\times6.842}{0.4618\times38.25\times73.65}=\dfrac{240\times0.38\times6.9}{0.46\times38\times75}=\dfrac{240\times38\times69}{46\times38\times75}\times\dfrac{1}{10}$

$=\left(\dfrac{24}{5}\times\dfrac{1}{10}\right)=\dfrac{4.8}{10}=0.48.$

So, the value is close to 0.4.

90. Given expression $=\dfrac{(0.2\times0.2+0.01)}{(0.1\times0.1+0.02)}=\dfrac{0.04+0.01}{0.01+0.02}=\dfrac{0.05}{0.03}=\dfrac{5}{3}.$

91. Given expression $=\dfrac{8-2.8}{1.3}=\dfrac{5.2}{1.3}=\dfrac{52}{13}=4.$

92. Given expression $=4.7\times(13.26+9.43+77.31)=4.7\times100=470.$

93. Given expression $=\dfrac{0.2\,(0.2+0.02)}{0.044}=\dfrac{0.2\times0.22}{0.044}=\dfrac{0.044}{0.044}=1.$

94. Given expression $=\dfrac{8.6\times(5.3+4.7)}{4.3\times(9.7-8.7)}=\dfrac{8.6\times10}{4.3\times1}=20.$

95. Given expression $=\dfrac{.896\times(.763+.237)}{.7\times(.064+.936)}=\dfrac{.896\times1}{.7\times1}=\dfrac{8.96}{7}=1.28.$

96. Given expression $=(a^2-b^2)=(a+b)(a-b)=(68.237+31.763)(68.237-31.763)$

$=(100\times36.474)=3647.4.$

97. Given expression $=\dfrac{a^2-b^2}{a-b}=\dfrac{(a+b)(a-b)}{(a-b)}=(a+b)=(2.39+1.61)=4.$

98. Given expression $=\dfrac{(2.644)^2-(2.356)^2}{2.644-2.356}=\dfrac{a^2-b^2}{a-b}=(a+b)=(2.644+2.356)=5.$

99. Let $\dfrac{(36.54)^2-(3.46)^2}{x}=40.$ Then, $x=\dfrac{(36.54)^2-(3.46)^2}{40}=\dfrac{(36.54)^2-(3.46)^2}{36.54+3.46}$

$=\dfrac{a^2-b^2}{a+b}=(a-b)=(36.54-3.46)=33.08.$

100. Given expression $=\dfrac{(67.542)^2-(32.458)^2}{(67.542+7.196)-(32.458+7.916)}$

$=\dfrac{(67.542)^2-(32.458)^2}{67.542-32.458}=(67.542+32.458)=100.$

101. Given expression $=\left(\dfrac{1.49\times1.49\times10-0.51\times0.51\times10}{1.49\times10-0.51\times10}\right)$

$=\dfrac{10\,[(1.49)^2-(0.51)^2]}{10\,(1.49-0.51)}=(1.49+0.51)=2.$

102. Given expression $= \dfrac{(a^2-b^2)}{(a+b)(a-b)} = \dfrac{(a^2-b^2)}{(a^2-b^2)} = 1.$

103. Given expression $= \dfrac{5.32\times(56+44)}{(7.66+2.34)(7.66-2.34)} = \dfrac{5.32\times100}{10\times5.32} = 10.$

104. Given expression $= \dfrac{[(0.6)^2]^2-[(0.5)^2]^2}{(0.6)^2+(0.5)^2} = \dfrac{[(0.6)^2+(0.5)^2]\,[(0.6)^2-(0.5)^2]}{(0.6)^2+(0.5)^2}$

$= (0.6)^2-(0.5)^2 = (0.6+0.5)(0.6-0.5) = (1.1\times0.1) = 0.11.$

105. Given expression $= (7.5\times7.5+2\times7.5\times2.5+2.5\times2.5)$

$= (a^2+2ab+b^2) = (a+b)^2 = (7.5+2.5)^2 = 10^2 = 100.$

106. $0.2\times0.2+0.02\times0.02-0.4\times0.02 = 0.2\times0.2+0.02\times0.02-2\times0.2\times0.02$

$= (a^2+b^2-2ab) = (a-b)^2 = (0.2-0.02)^2$

$= (0.18)^2.$

$\therefore$ Given expression $= \dfrac{(0.18\times0.18)}{0.36} = 0.09.$

107. Given expression $= (11.98)^2+(0.02)^2+11.98\times x.$

For the given expression to be a perfect square, we must have

$11.98\times x = 2\times11.98\times0.02$ or $x = 0.04.$

108. Given expression $= \dfrac{(a-b)^2+(a+b)^2}{a^2+b^2} = \dfrac{2(a^2+b^2)}{(a^2+b^2)} = 2.$

109. Given expression $= \dfrac{(a+b)^2-(a-b)^2}{ab} = \dfrac{4ab}{ab} = 4.$

110. Given expression $= \dfrac{(0.051)^3+(0.041)^3}{(0.051)^2-(0.051\times0.041)+(0.041)^2} = \left(\dfrac{a^3+b^3}{a^2-ab+b^2}\right)$

$= (a+b) = (0.051+0.041) = 0.092.$

111. Given expression $= \dfrac{(.953)^2-(.953\times.047)+(.047)^2}{(.953)^3+(.047)^3}$

$= \left(\dfrac{a^2-ab+b^2}{a^3+b^3}\right) = \dfrac{1}{a+b} = \dfrac{1}{.953+.047} = 1.$

112. Given expression $= \dfrac{(0.5)^3+(0.3)^3}{(0.5)^2+(0.3)^2-(0.5\times0.3)} = \left(\dfrac{a^3+b^3}{a^2+b^2-ab}\right)$

$= (a+b) = (0.5+0.3) = 0.8.$

113. Given expression $= \dfrac{(10.3)^3+(1)^3}{(10.3)^2-(10.3\times1)+(1)^2} = \left(\dfrac{a^3+b^3}{a^2-ab+b^2}\right)$

$= (a+b) = (10.3+1) = 11.3.$

114. Given expression $= \dfrac{(2\times3.75)^3+(1)^3}{(7.5)^2-(7.5\times1)+(1)^2} = \dfrac{(7.5)^3+(1)^3}{(7.5)^2-(7.5\times1)+(1)^2}$

$= \left(\dfrac{a^3+b^3}{a^2-ab+b^2}\right) = (a+b) = (7.5+1) = 8.5.$

115. Given expression $= \dfrac{(0.1)^3 + (0.02)^3}{2^3\,[(0.1)^3 + (0.02)^3]} = \dfrac{1}{8} = 0.125.$

116. Given expression $= \dfrac{(8.94)^3 - (3.56)^3}{(8.94)^2 + 8.94 \times 3.56 + (3.56)^2} = \left(\dfrac{a^3 - b^3}{a^2 + ab + b^2}\right)$

$= (a - b) = (8.94 - 3.56) = 5.38.$

117. Given expression $= \dfrac{(0.96)^3 - (0.1)^3}{(0.96)^2 + (0.96 \times 0.1) + (0.1)^2} = \left(\dfrac{a^3 - b^3}{a^2 + ab + b^2}\right)$

$= (a - b) = (0.96 - 0.1) = 0.86.$

118. Given expression $= \dfrac{(2.3)^3 - (0.3)^3}{(2.3)^2 + (2.3 \times 0.3) + (0.3)^2} = \left(\dfrac{a^3 - b^3}{a^2 + ab + b^2}\right)$

$= (a - b) = (2.3 - 0.3) = 2.$

119. Given expression $= \dfrac{a^2 + b^2 + c^2}{\left(\dfrac{a}{10}\right)^2 + \left(\dfrac{b}{10}\right)^2 + \left(\dfrac{c}{10}\right)^2}$, where $a = 0.6$, $b = 0.47$ and $c = 0.079$.

$= \dfrac{100\,(a^2 + b^2 + c^2)}{(a^2 + b^2 + c^2)} = 100.$