1. (d) $11 \times 11 + 11 \div 11 - 11 \times 11 + 11 + 11 \times 11 - 11 - 11 \times 11$
   $= 121 + 1 - 121 + 11 + 121 - 11 - 121 = 1$

2. (c)

$$\frac{0.04}{0.05} \text{ of } \frac{\left(3\frac{1}{3} - 2\frac{1}{2}\right) \div \frac{1}{2} \text{ of } 1\frac{1}{4}}{\frac{1}{3} + \frac{1}{5} \text{ of } \frac{1}{9}}$$

$$= \frac{4}{5} \text{ of } \frac{\left(\frac{10}{3} - \frac{5}{2}\right) \div \frac{1}{2} \text{ of } \frac{5}{4}}{\frac{1}{3} + \frac{1}{45}}$$

$$= \frac{4}{5} \text{ of } \frac{\frac{5}{6} + \frac{5}{8}}{\frac{16}{45}} = \frac{4}{5} \text{ of } \frac{4}{3} \times \frac{45}{16}$$

$$= \frac{4}{5} \text{ of } \frac{15}{4} = 3$$

3. (d) $\dfrac{a^2 - b^2 - 2bc - c^2}{a^2 + b^2 + 2ab - c^2} = \dfrac{a^2 - (b+c)^2}{(a+b)^2 - c^2}$

$$= \frac{[a-(b+c)][a+b+c]}{[(a+b-c)][a+b+c]} = \frac{a-b-c}{a+b-c}$$

4. (d) $6.9 - \left[8.6 - \{6.5 - (5.4 - \overline{4.3 - 2})\}\right]$
   $= 6.9 - [8.6 - \{6.5 - (5.4 - 2.3)\}]$

   $= 6.9 - [8.6 - \{6.5 - 3.1\}]$
   $= 6.9 - [8.6 - 3.4]$
   $= 6.9 - 5.2 = 1.7$

5. (c) $7 \to 217$ eggs
   total days in July, Aug and Sept.
   $\Rightarrow 31 + 31 + 30 = 92$
   ATQ,

   $$\frac{217}{7} \times 92 = 2852$$

6. (d) $\dfrac{1}{12} + \dfrac{1}{16} + \dfrac{1}{8}$

   $$\Rightarrow \frac{4+3+6}{16 \times 3} = \frac{13}{48}$$

7. (d) $A + \dfrac{1}{1 + \dfrac{1}{2 + \dfrac{1}{3}}} = \dfrac{9}{10}$

   $$\Rightarrow A + \frac{1}{1 + \frac{3}{7}} = \frac{9}{10}$$

   $$\Rightarrow A + \frac{7}{10} = \frac{9}{10}$$

   $$\Rightarrow A = \frac{2}{10} = \frac{1}{5}$$

8. (d) $(48 \div 72 \times 3) - [15 \div 8 \times (40 - 32) - 10] + 2P = 6 \div 2$

   $$\Rightarrow \left(\frac{2}{3} \times 3\right) - \left[\frac{15}{8} \times 8 - 10\right] + 2P = 3$$

   $\Rightarrow 2 - 5 + 2P = 3$
   $\Rightarrow 2P = 6$
   $\Rightarrow P = 3$

9. (b) Let, ? $= x$

   $7\frac{5}{8} + \frac{5}{8}$ of $184 \times 15 \div 5 - x = 0$

   $$\Rightarrow 7\frac{5}{8} + (5 \times 23) \times \frac{15}{5} - x = 0$$

   $$\Rightarrow 7\frac{5}{8} + 345 - x = 0$$

   $$\Rightarrow 7 + \frac{5}{8} + 345 - x = 0$$

   $$\Rightarrow 352\frac{5}{8} - x = 0$$

   $$x = 352\frac{5}{8}$$

10. (c) $\dfrac{1 - \frac{3}{7} \div \frac{9}{49} \times \frac{3}{14}}{1 + \frac{3}{5} \div \frac{1}{25} \times \frac{1}{30}}$

$= \dfrac{1 - \frac{3}{7} \times \frac{49}{9} \times \frac{3}{14}}{1 + \frac{3}{5} \times \frac{25}{1} \times \frac{1}{30}} = \dfrac{1 - \frac{1}{2}}{1 + \frac{1}{2}} = \dfrac{\frac{1}{2}}{\frac{3}{2}} = \dfrac{1}{3}$

11. (c) $\sqrt{\dfrac{1}{4} \times \dfrac{1}{9} \times \dfrac{1}{25} \times \dfrac{1}{49} \div \dfrac{36}{121}}$

$= \dfrac{1}{2} \times \dfrac{1}{3} \times \dfrac{1}{5} \times \dfrac{1}{7} \times \dfrac{11}{6} = \dfrac{11}{1260}$

12. (a) $5\frac{1}{3} - \left\{ 4\frac{1}{3} + \left(3\frac{1}{3} \div 2\overline{\frac{1}{3} - \frac{1}{3}} \right) \right\}$

$= \dfrac{16}{3} - \left\{ \dfrac{13}{3} + \left(\dfrac{10}{3} \div \overline{\frac{7}{3} - \frac{1}{3}} \right) \right\}$

$= \dfrac{16}{3} - \left\{ \dfrac{13}{3} + \left(\dfrac{10}{3} \div 2 \right) \right\}$

$= \dfrac{16}{3} - \left\{ \dfrac{13}{3} + \dfrac{5}{3} \right\} = \dfrac{16}{3} - \dfrac{18}{3} = \dfrac{-2}{3}$

13. (a)

$1\frac{2}{5} - \left[3\frac{3}{4} + \left\{ 1\frac{1}{4} + \frac{1}{2} \left(1\frac{1}{2} \times 3\frac{1}{3} + 1\frac{1}{3} \right) \right\} \right]$

$= \dfrac{7}{5} - \left[\dfrac{15}{4} \div \left\{ \dfrac{5}{4} \div \dfrac{1}{2} \left(\dfrac{3}{2} \times \dfrac{10}{3} \div \dfrac{4}{3} \right) \right\} \right]$

$= \dfrac{7}{5} - \left[\dfrac{15}{4} \div \left\{ \dfrac{5}{4} \div \dfrac{1}{2} \left(\dfrac{3}{2} \times \dfrac{10}{3} \times \dfrac{3}{4} \right) \right\} \right]$

$= \dfrac{7}{5} - \left[\dfrac{15}{4} \div \left\{ \dfrac{5}{4} \div \dfrac{1}{2} \times \dfrac{15}{4} \right\} \right]$

$= \dfrac{7}{5} - \left[\dfrac{15}{4} \div \left\{ \dfrac{5}{2} \times \dfrac{15}{4} \right\} \right]$

$= \dfrac{7}{5} - \left[\dfrac{15}{4} \div \dfrac{75}{8} \right] = \dfrac{7}{5} - \dfrac{2}{5} = \dfrac{5}{5} = 1$

14. (d) $\because \dfrac{a^2 + ab + b^2}{a^3 - b^3} = \dfrac{a^2 + b^2 + ab}{(a-b)(a^2 + b^2 + ab)}$

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

$\therefore \dfrac{(157 \times 157) + (157 \times 133) + (133 \times 133)}{(157 \times 157 \times) - (133 \times 133 \times 133)}$

$= \dfrac{1}{157 - 133} = \dfrac{1}{24}$

15. (b) $19 \div 5$ of $(27 - \overline{15 - 21}) + 37$

$= 19 \div 5$ of $(27 + 6) + 37$

$= 19 \div 5$ of $(33) + 37$

$= 19 \div 165 + 37$

$= \dfrac{19}{165} + 37$

$= \dfrac{6124}{165}$

16. (a)

$\dfrac{\begin{matrix}(3.254 \times 3.254 \times 3.254) - \\ (0.746 \times 0.746 \times 0.746)\end{matrix}}{\begin{matrix}(3.254 \times 3.254) + (0.746 \times 0.746) \\ + (3.254 \times 0.746)\end{matrix}}$

$\because \dfrac{a^3 - b^3}{a^2 + b^2 + ab} = a - b$

$\Rightarrow 3.254 - 0.746 = 2.508$

17. (c)

$\dfrac{a^2 - (b-c)^2}{(a+c)^2 - b^2} + \dfrac{b^2 - (a-c)^2}{(a+b)^2 - c^2} + \dfrac{c^2 - (a-b)^2}{(b+c)^2 - a^2}$

$= \dfrac{a+b-c}{a+b+c} + \dfrac{b-a+c}{a+b+c} + \dfrac{c+a-b}{a+b+c}$

$= \dfrac{a+b-c+b-a+c+c+a-b}{a+b+c}$

$= \dfrac{a+b+c}{a+b+c} = 1$

18. (d) $\dfrac{4}{3} \div \dfrac{2}{5} \times \dfrac{x}{5} = \dfrac{5}{4} \times \dfrac{2}{3} \div \dfrac{1}{6}$

$\Rightarrow \dfrac{4}{3} \times \dfrac{5}{2} \times \dfrac{x}{5} = \dfrac{5}{4} \times \dfrac{2}{3} \times \dfrac{6}{1}$

$\Rightarrow \dfrac{2}{3} \times x = 5$

$\Rightarrow x = \dfrac{15}{2} = 7.5$

19. (c) If $a + b + c = 0$

then,

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

$\therefore (1+x)^3 + (1-x)^3 + (-2)^3$

$= 3(1+x)(1-x)(-2) = -6(1-x^2)$

20. (a) $\because [(a-b)^2 - (a+b)^2 = -4ab]$

$\therefore (1-2x)^2 - (1+2x)^2$

$= -4 \times 1 \times 2x = -8x$

21. (c) $\dfrac{1\frac{1}{2} + 3\frac{1}{4} + \frac{1}{2} + \frac{13}{14} + \frac{1}{5}}{\frac{1}{5} \times 3\frac{1}{2} - \frac{1}{3} + 1\frac{3}{4} \times 3\frac{1}{2}}$

$= \dfrac{\frac{3}{2} \times \frac{4}{13} + \frac{1}{2} \times \frac{14}{13} + \frac{1}{5}}{\frac{1}{5} \times \frac{7}{2} - \frac{1}{3} \times \frac{4}{7} \times \frac{7}{2}}$

$= \dfrac{\frac{6}{13} + \frac{7}{13} + \frac{1}{5}}{\frac{7}{10} - \frac{2}{3}} = \dfrac{\frac{6}{5}}{\frac{1}{30}} = 36$

22. (c) $9 \times 2 \div 3$ of $24 - 3 \div 2 \times (6 - 7)$ $\times 2 + 3 \div 3$ of 5

$= 9 \times 2 \div 72 - \dfrac{3}{2} \times (-1) \times 2 + 3 \div 15$

$= 9 \times \dfrac{2}{72} + 3 + \dfrac{3}{15}$

$= \dfrac{1}{4} + 3 + \dfrac{1}{5}$

$= \dfrac{5 + 60 + 4}{20} = \dfrac{69}{20}$

23. (b) $b + 2a - [(3b + a) - (2a + b) + 2a] - a$

$= b + 2a - [3b + a - 2a - b + 2a] - a$

$= b + 2a - [2b + a] - a$

$= b + 2a - 2b - a - a = -b$

24. (d) $(x - 2y)(y - 3x) + (x + y)(x - y)$ $+ (x - 3y)(2x + y)$

$\Rightarrow 7xy - 3x^2 - 2y^2 + x^2 - y^2 + 2x^2 -$ $5xy - 3y^2$

$= 2xy - 6y^2 = 2y[x - 3y]$

25. (b) $19 \div 5$ of $(27 - \overline{15 - 21}) \div 33$

$= 19 \div 5$ of $(27 + 6) \div 33$

$= 19 \div 5 \times 33 \div 33$

$= \dfrac{19}{5}$

26. (d) Using the simplification rule BODMAS

$= 81^{\frac{3}{4}} + \left[\begin{matrix} (20 \div 5 \text{ of } 3 \times 6) + \\ \{(8 \div 24 \text{ of } 3) \times 4\} \\ -10 \div 5 \end{matrix} \right] - \left(\dfrac{1}{32} \right)^{\frac{-2}{5}}$

$= (3)^{4 \times \frac{3}{4}} + \left[\begin{matrix} (20 \div 15 \times 6) + \\ \{(8 \div 72) \times 4\} - 10 \div 5 \end{matrix} \right] - \left(\dfrac{1}{2} \right)^{5 \times \frac{-2}{5}}$

$= (3)^3 + \left[\left(\dfrac{20}{15} \times 6 \right) + \left\{ \dfrac{8}{72} \times 4 \right\} - 2 \right] - 4$

$= 27 + \left[8 + \dfrac{4}{9} - 2 \right] - 4$

$= 27 + 8 - 2 - 4 + \dfrac{4}{9} = 29\dfrac{4}{9}$

27. (c) Given,

$= \dfrac{\sqrt[3]{-2744} \times \sqrt[3]{-216}}{\sqrt[3]{\frac{64}{729}}}$

$= \dfrac{\sqrt[3]{-14 \times -14 \times -14}}{\times \sqrt[3]{-6 \times -6 \times -6}}{\sqrt[3]{\frac{4 \times 4 \times 4}{9 \times 9 \times 9}}}$

$= \dfrac{-14 \times -6}{\frac{4}{9}}$

$= \dfrac{-14 \times -6 \times 9}{4} = 189$

28. (c) $72 \div 8 \times [\{(57 - 49) \div 2\} + \{(85 - 60) \div 5\} - \{(28 - 19) \div 3\}]$

$= 9 \times [\{8 \div 2\} + \{25 \div 5\} - \{9 \div 3\}]$

$= 9 \times [4 + 5 - 3]$

$= 9 \times [6] = 54$

29. (b) $1801 \times 1801 = (1801)^2$
$= (1800 + 1)^2$
$= 1800^2 + 2 \times 1800 \times 1 + 1^2$
$= 3240000 + 3600 + 1$
$= 3243601$

30. (d) Rules of Surds and Indices
1. $a^m \times a^n = a^{(m+n)}$
2. $a^m \div a^n = a^{(m-n)}$
3. if $a^m = a^n$ then $m = n$
$\{(5 \times 5 \times 5 \times 5 \times 5 \times 5)^5 \times (5 \times 5 \times 5 \times 5 \times 5)^8\} \div (5 \times 5) = (625)^a$
$\Rightarrow \{(5)^{6 \times 5} \times (5)^{5 \times 8}\} \div (5)^2 = (5 \times 5 \times 5 \times 5)^a$
$\Rightarrow \{(5)^{30} \times (5)^{40}\} \div (5)^2 = (5)^{4a}$
$\Rightarrow (5)^{30+40} \div (5)^2 = (5)^{4a}$
$\Rightarrow (5)^{70-2} = (5)^{4a}$
$\Rightarrow (5)^{68} = (5)^{4a}$
$\Rightarrow 68 = 4a$
$\Rightarrow a = 17$

31. (c) Solve using the simplification rule BODMAS
$12^3 \times (16^2 - 14^2 - 40) \div 2 - 9^4$
$= 1728 \times (256 - 196 - 40) \div 2 - 6561$
$= 1728 \times 20 \div 2 - 6561$
$= 17280 - 6561 = 10719$

32. (c) Solve using the simplification rule BODMAS
$72 - 42 \div 6$ of 7×4 of $3 + 4 \times 3 - 5$
$= 72 - 42 \div 42 \times 12 + 4 \times 3 - 5$
$= 72 - 1 \times 3 \times 3 - 5$
$= 72 - 9 - 5 = 72 - 14 = 58$

33. (d)
Given,
$\{(1 \div x) \times (x^3 - 2x^2) + (4^3 \div 2^5) \times x\} \div 25 = 1$
$\Rightarrow \dfrac{\left\{\dfrac{1}{x} \times x(x^2 - 2x) + 2 \times x\right\}}{25} = 1$
$\Rightarrow x^2 - 2x + 2x = 25$
$\Rightarrow x^2 = 25$
$\Rightarrow x^2 = \pm 25$
$\Rightarrow x^2 = \pm 5$

34. (a) $(0.00243)^{0.2} = \left(\dfrac{243}{100000}\right)^{\frac{1}{5}}$
$= \left(\dfrac{3}{10}\right)^{5 \times \frac{1}{5}} = \dfrac{3}{10} = 0.3$

35. (a) $(0.2)^3 \times 400 \div 2000$ of $(0.2)^2$
$= 0.008 \times 400 \div 2000$ of 0.04
$= 0.008 \times 400 \div 80$
$= 0.008 \times 5$
$= 0.040 = \dfrac{1}{25}$

36. (a) $(7^3 - 7^2 + 6) \times (6^3 - 2^3 - 3^2 + 1) \div (21^2 + 20^2 - 41)$
$= (343 - 49 + 6) \times (216 - 8 - 9 + 1) \div (441 + 400 - 41)$
$= (349 - 49) \times (217 - 17) \div (841 - 41)$
$= \dfrac{300 \times 200}{800} = 75$

37. (a)
$456 - (76 + 15^2) + \dfrac{3}{4}$ of $\dfrac{76}{18} \div \left(\dfrac{19}{72 \times 24}\right)$
$= 456 - (76 + 225) + \dfrac{19}{6} \div \left(\dfrac{19}{72 \times 24}\right)$
$= 456 - 301 + \dfrac{19}{6} \times \left(\dfrac{72 \times 24}{19}\right)$
$= 456 - 301 + 288$
$= 744 - 301 = 443$

38. (c) $\therefore \dfrac{\dfrac{5}{2} - \dfrac{3}{7} \times 1\dfrac{4}{5} \div 3\dfrac{6}{7}}{\dfrac{3}{2} + 1\dfrac{2}{5} \div 3\dfrac{1}{2} \times 1\dfrac{1}{4}}$

$= \dfrac{\dfrac{5}{2} - \dfrac{3}{7} \times \dfrac{9}{5} \div \dfrac{27}{7}}{\dfrac{3}{2} + \dfrac{7}{5} \div \dfrac{7}{2} \times \dfrac{5}{4}} = \dfrac{\dfrac{5}{2} - \dfrac{3}{7} \times \dfrac{9}{5} \times \dfrac{7}{27}}{\dfrac{3}{2} + \dfrac{7}{5} \times \dfrac{2}{7} \times \dfrac{5}{4}}$

$= \dfrac{\dfrac{5}{2} - \dfrac{1}{5}}{\dfrac{3}{2} + \dfrac{1}{2}} = \dfrac{23}{10} \times \dfrac{1}{2} = 1\dfrac{3}{20}$

39. (c)
$\{1 + 7 + (16 \div 8 \div 2)\} + \left\{(6 \times 2^2 + 6) \times \dfrac{2}{\sqrt{36}}\right\}$
$= \{8 + 1\} + \left\{(6 \times 4 + 6) \times \dfrac{2}{6}\right\}$
$= 9 + \left\{30 \times \dfrac{2}{6}\right\} = 9 + 10 = 19$

40. (c)
$\left[1\dfrac{2}{7} \times \left\{3\dfrac{1}{2} \div \left(\dfrac{1}{2} - \dfrac{1}{7}\right)\right\}\right] \div \left(4\dfrac{1}{5} \times 1\dfrac{1}{2}\right)$
$= \left[\dfrac{9}{7} \times \left\{\dfrac{7}{2} \div \left(\dfrac{1}{2} - \dfrac{1}{7}\right)\right\}\right] \div \left(\dfrac{21}{5} \times \dfrac{3}{2}\right)$
$= \left[\dfrac{9}{7} \times \left\{\dfrac{7}{2} \div \left(\dfrac{7-2}{14}\right)\right\}\right] \div \left(\dfrac{63}{10}\right)$
$= \left[\dfrac{9}{7} \times \left\{\dfrac{7}{2} \div \dfrac{5}{14}\right\}\right] \div \left(\dfrac{63}{10}\right)$
$= \left[\dfrac{9}{7} \times \left\{\dfrac{7}{2} \times \dfrac{14}{5}\right\}\right] \div \left(\dfrac{63}{10}\right)$
$= \left[\dfrac{126}{10}\right] \div \left(\dfrac{63}{10}\right) = 2$

41. (c)
$\dfrac{\left[\dfrac{5}{8} - \left\{\dfrac{3}{8} - \left(\dfrac{5}{8} - \dfrac{3}{8}\right)\right\}\right] \text{ of } 8.8 - 1.2}{4\dfrac{1}{6} \div 2.5 \times 2 \div \dfrac{1}{6} \text{ of } 60 + \left(\dfrac{3}{4} - \dfrac{3}{8}\right)}$

$= \dfrac{\left[\dfrac{5}{8} - \left\{\dfrac{3}{8} - \dfrac{2}{8}\right\}\right] \text{ of } 8.8 - 1.2}{\dfrac{25}{6} \div 2.5 \times 2 \div 10 + \left(\dfrac{6-3}{8}\right)}$

$= \dfrac{\left[\dfrac{5}{8} - \dfrac{1}{8}\right] \text{ of } 8.8 - 1.2}{\dfrac{25}{6} \times \dfrac{10}{25} \times 2 \times \dfrac{1}{10} + \left(\dfrac{3}{8}\right)}$

$= \dfrac{\dfrac{1}{2} \text{ of } 8.8 - 1.2}{\dfrac{1}{3} + \left(\dfrac{3}{8}\right)} = \dfrac{4.4 - 1.2}{\dfrac{1}{3} + \left(\dfrac{3}{8}\right)}$

$= \dfrac{4.4 - 1.2}{\dfrac{8+9}{24}} = \dfrac{3.2 \times 24}{17} = 4\dfrac{44}{85}$

42. (c)
$6\dfrac{8}{15} \div \dfrac{7}{9} \text{ of } \left(1\dfrac{1}{10} + 5\dfrac{1}{5}\right) + \dfrac{2}{5} \div 7\dfrac{1}{5}$

$= \dfrac{98}{15} \div \dfrac{7}{9} \text{ of } \left(\dfrac{11}{10} + \dfrac{26}{5}\right) + \dfrac{2}{5} \div \dfrac{36}{5}$

$= \dfrac{98}{15} \div \dfrac{7}{9} \text{ of } \left(\dfrac{11+52}{10}\right) + \dfrac{2}{5} \div \dfrac{36}{5}$

$= \dfrac{98}{15} \div \dfrac{7}{9} \text{ of } \dfrac{63}{10} + \dfrac{2}{5} \div \dfrac{36}{5}$

$= \dfrac{98}{15} \div \dfrac{49}{10} + \dfrac{2}{5} \div \dfrac{36}{5}$

$= \dfrac{98}{15} \times \dfrac{10}{49} + \dfrac{2}{5} \times \dfrac{5}{36}$

$= \dfrac{4}{3} + \dfrac{1}{18} = \dfrac{24+1}{18} = \dfrac{25}{18}$

43. (b) $\dfrac{(187 \div 17 \times a - 3 \times 3)}{(8^2 - 9 \times 7 + a^2)} = 1$
$\Rightarrow \dfrac{11a - 9}{1 + a^2} = 1$
$\Rightarrow 11a - 9 = 1 + a^2$
$\Rightarrow a^2 - 11a + 10 = 0$
$\Rightarrow a^2 - 10a - a + 10 = 0$
$\Rightarrow a(a - 10) - 1(a - 10) = 0$
$\Rightarrow (a - 1)(a - 10) = 0$
$\Rightarrow a = 1$ or 10
Hence, Answer (b)

💡 **SMART APPROACH:-**
Put the value from the option directly.

44. (c) $\sqrt{1+\dfrac{x}{529}}=\dfrac{24}{23}$

Squaring both sides

$\Rightarrow 1+\dfrac{x}{529}=\dfrac{576}{529}$

$\Rightarrow \dfrac{529+x}{529}=\dfrac{576}{529}$

$\Rightarrow x = 576 - 529$

$\Rightarrow x = 47$

45. (a) $12 - 8 \div 2 - \{16 \text{ of } (-2) + (3 \times 5 - 4)\}$

$= 12 - 4 - \{-32 + 11\}$

$= 12 - 4 + 21$

$= 33 - 4$

$= 29$

46. (b)

$\sqrt{36 \div 15 \text{ of } 2 \text{ of } \left[\begin{array}{c} 25 \times 4 \div 4 \text{ of} \\ \{29-(8-11)\} \\ \div (9 \times 5 \div 5 \text{ of } 3) \end{array}\right]}$

$= \sqrt{36 \div 15 \text{ of } 2 \text{ of } \left[\begin{array}{c} 25 \times 4 \div 4 \text{ of} \\ \{29 + 3 \div \\ (45 \div 15)\} \end{array}\right]}$

$= \sqrt{36 \div 15 \text{ of } 2 \text{ of } \left[\begin{array}{c} 100 \div 4 \text{ of} \\ \{29 + 3 \div 3\} \end{array}\right]}$

$= \sqrt{36 \div 15 \text{ of } 2 \text{ of } [100 \div 4 \text{ of } 30]}$

$= \sqrt{36 \div 15 \text{ of } 2 \text{ of } [100 \div 120]}$

$= \sqrt{36 \div 15 \text{ of } 2 \text{ of } \dfrac{5}{6}}$

$= \sqrt{\dfrac{36}{25}} = \dfrac{6}{5} = 1\dfrac{1}{5}$

47. (d) $25 \div 5 \text{ of } 12 \times 2 - 9 \div 27 \text{ of } 3 \times 5 - 14 \div 28 \times 4$

$= 25 \div 60 \times 2 - 9 \div 81 \times 5 - 14 \div 28 \times 4$

$= \dfrac{25}{60} \times 2 - \dfrac{5}{9} - \dfrac{14}{28} \times 4 = \dfrac{5}{6} - \dfrac{5}{9} - 2$

$= \dfrac{15 - 10 - 36}{18} = \dfrac{-31}{18}$

48. (d)

$\left[25^2 + 8 \div 2^3 - \left\{\begin{array}{c} 16 + (28 \text{ of } 7 \div 2^2) \\ - \left(18^2 \div 12^2 \text{ of } \dfrac{1}{8}\right) \end{array}\right\}\right]$

$= \left[625 + 8 \div 8 - \left\{\begin{array}{c} 16 + (28 \text{ of } 7 \div 4) - \\ \left(324 \div 144 \text{ of } \dfrac{1}{8}\right) \end{array}\right\}\right]$

$= [625 + 1 - \{16 + 49 - (324 \div 18)\}]$

$= [626 - \{16 + 49 - 18\}]$

$= 626 - 47 = 579$

49. (d) $= (1018)^2 - 1019 \times 1017 + 1015 \times 1012 - 1016 \times 1011$

$= 1036324 - 1036323 + 1027180 - 1027176 = 1 + 4 = 5$

Alternate Method:

Using the concept of unit Digit

$= (8)^2 - 9 \times 7 + 5 \times 2 - 6 \times 1$

$= 4 - 3 + 0 - 6$

$= 4 - 9 \quad = -5$

Required Answer $= 10 - 5 = 5$

50. (b) Given factions is:

$\dfrac{15}{7}, \dfrac{5}{11}, \dfrac{21}{77} = \dfrac{3}{11}$

Descending order of the fractions:

$\dfrac{15}{7} > \dfrac{5}{11} > \dfrac{3}{11}$

51. (d)

$\dfrac{6.35 \times 6.35 \times 6.35 + 3.65 \times 3.65 \times 3.65}{63.5 \times 63.5 + 36.5 \times 36.5 - 63.5 \times 36.5} = ?$

$\because \dfrac{a^3 + b^3}{a^2 + b^2 - ab} = (a + b)$

$a = 6.35$

$b = 3.65$

$\Rightarrow \dfrac{1}{10000}[635 + 365] \Rightarrow \dfrac{1000}{10000} = 0.1$

52. (a) $\dfrac{40 - \dfrac{3}{4} \text{ of } 32}{37 - \dfrac{3}{4} \text{ of } (34 - 6)} = ?$

$\Rightarrow \dfrac{40 - \dfrac{3}{4} \times 32}{37 - \dfrac{3}{4} \times 28}$

$\Rightarrow \dfrac{40 - 24}{37 - 21} \Rightarrow \dfrac{16}{16} = 1$

53. (c)

$\left(5\dfrac{1}{4} + \dfrac{3}{7} \text{ of } \dfrac{1}{2}\right) \div \left(5\dfrac{1}{9} - 7\dfrac{7}{8} \div 9\dfrac{9}{20}\right) \times$

$\dfrac{11}{21} - \left(5 \div 2 \text{ of } \dfrac{1}{2}\right) = ?$

$= \left(\dfrac{21}{4} \div \dfrac{3}{7} \times \dfrac{1}{2}\right) \div \left(\dfrac{46}{9} - \dfrac{63}{8} \div \dfrac{189}{20}\right) \times$

$\dfrac{11}{21} - (5 \div 1)$

$\Rightarrow \dfrac{\left(\dfrac{21}{4} \times \dfrac{14}{3}\right)}{\left(\dfrac{46}{9} - \dfrac{63}{8} \times \dfrac{20}{189}\right)} \times \dfrac{11}{21} - 5$

$= \dfrac{\dfrac{49}{2}}{\dfrac{184 - 30}{36}} \times \dfrac{11}{21} - 5$

$= \dfrac{49 \times 36 \times 11}{2 \times 154 \times 21} - 5 = 3 - 5 = -2$

54. (a)

$\dfrac{0.325 \times 0.325 + 0.175 \times 0.175 + 25 \times 0.00455}{5 \times 0.0065 \times 3.25 - 7 \times 0.175 \times 0.025} - \dfrac{0.5}{1.5} = ?$

$\Rightarrow \dfrac{\begin{array}{c}0.325 \times 0.325 + 0.175 \times \\ 0.175 + 0.175 \times 0.65\end{array}}{0.325 \times 0.325 - 0.175 \times 0.175} - \dfrac{0.5}{1.5}$

$\Rightarrow \dfrac{\begin{array}{c}0.325 \times 0.325 + 0.175 \times \\ 0.175 + 0.175 \times 0.325 \times 2\end{array}}{0.325 \times 0.325 - 0.175 \times 0.175} - \dfrac{0.5}{1.5}$

$\because a = 0.325, \quad b = 0.175$

$\Rightarrow \dfrac{0.325 + 0.175}{0.325 - 0.175} - \dfrac{0.5}{1.5}$

$\Rightarrow \dfrac{0.5}{.15} - \dfrac{0.5}{1.5}$

$\Rightarrow \dfrac{50}{15} - \dfrac{5}{15} \quad \Rightarrow \dfrac{45}{15} = 3$

55. (c)

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

$\Rightarrow \dfrac{10}{3} \div \dfrac{5}{2} \times \dfrac{8}{5} + \left(\dfrac{3}{8} + \dfrac{1}{7} \times \dfrac{7}{4}\right)$

$\Rightarrow \dfrac{10}{3 \times 4} + \dfrac{5}{8}$

$\Rightarrow \dfrac{5}{6} + \dfrac{5}{8} \Rightarrow \dfrac{35}{24}$

56. (a) $2\dfrac{1}{3} \div 2\dfrac{1}{2} \text{ of } 1\dfrac{3}{5} + \left(\dfrac{3}{8} + \dfrac{1}{7} \times 1\dfrac{3}{4}\right) = ?$

$\Rightarrow \dfrac{7}{3} \div \dfrac{5}{2} \times \dfrac{8}{5} + \left(\dfrac{3}{8} + \dfrac{1}{7} \times \dfrac{7}{4}\right)$

$\Rightarrow \dfrac{7}{3 \times 4} + \left(\dfrac{5}{8}\right) \Rightarrow \dfrac{14 + 15}{24} = \dfrac{29}{24}$

57. (a)

$\dfrac{\begin{array}{c}0.325 \times 0.325 + 0.175 \times \\ 0.175 + 25 \times 0.00455\end{array}}{5 \times 0.0065 \times 3.25} + \dfrac{0.5}{1.5} = ?$

$-7 \times 0.175 \times 0.025$

$\Rightarrow \dfrac{\begin{array}{c}0.325 \times 0.325 + 0.175 \times \\ 0.175 + 2 \times 0.325 \times 0.175\end{array}}{0.325 \times 0.325 - 0.175 \times 0.175} + \dfrac{0.5}{1.5}$

$\because a = 0.325, \ b = 0.175$

$\Rightarrow \dfrac{(a+b)^2}{a^2 - b^2} + \dfrac{0.5}{1.5} \Rightarrow \dfrac{a+b}{a-b} + \dfrac{0.5}{1.5}$

$\Rightarrow \dfrac{0.5}{.15} + \dfrac{0.5}{1.5} \Rightarrow \dfrac{50}{15} + \dfrac{5}{15}$

$\Rightarrow \dfrac{50}{15} \Rightarrow \dfrac{11}{3}$

58. (d) $\left(5 \div 2 \text{ of } \frac{1}{2}\right) + \left(5\frac{1}{4} \div \frac{3}{7} \text{ of } \frac{1}{2}\right)$

$\div \left(5\frac{1}{9} - 7\frac{7}{8} \div 9\frac{9}{20}\right) \times \frac{11}{21} = ?$

$\Rightarrow 5 + \left(\frac{21}{4} \div \frac{3}{14}\right) \div \left(\frac{46}{9} - \frac{63}{8} \div \frac{189}{20}\right) \times \frac{11}{21}$

$\Rightarrow 5 + \left(\frac{49}{2}\right) \div \left(\frac{46}{9} - \frac{63}{8} \times \frac{20}{189}\right) \times \frac{11}{21}$

$\Rightarrow 5 + \frac{49}{2} \div \left(\frac{46}{9} - \frac{5}{6}\right) \times \frac{11}{21}$

$\Rightarrow 5 + \frac{49}{2} \div \left(\frac{184-30}{36}\right) \times \frac{11}{21}$

$\Rightarrow 5 + \frac{49 \times 36}{2 \times 154} \times \frac{11}{21}$

$\Rightarrow 5 + 3 = 8$

59. (c)

$\frac{4.35 \times 4.35 \times 4.35 + 3.25 \times 3.25 \times 3.25}{43.5 \times 43.5 + 32.5 \times 32.5 - 43.5 \times 32.5} = ?$

$\Rightarrow \frac{1}{10000}\left[\frac{435^3 + 325^3}{435^2 + 325^2 - 435 \times 325}\right]$

$\Rightarrow \frac{1}{10000}\left[\frac{760}{1}\right] \Rightarrow 0.076$

60. (d)

$\frac{2}{3} \div \frac{3}{10} \text{ of } \frac{4}{9} - \frac{4}{5} \times 1\frac{1}{9} \div \frac{8}{15} - \frac{3}{4} + \frac{3}{4} \div \frac{1}{2} = ?$

$\Rightarrow \frac{2 \times 90}{3 \times 12} - \frac{4}{5} \times \frac{10}{9} \times \frac{15}{8} - \frac{3}{4} + \frac{3}{2}$

$\Rightarrow 5 - \frac{5}{3} - \frac{3}{4} + \frac{3}{2}$

$\Rightarrow \frac{13}{2} - \frac{29}{12} = \frac{78-29}{12} = \frac{49}{12}$

61. (d)

$-7 \div \left[5 + 1 \div 2 - \{4 + (4 \text{ of } 2 \div 4) + (4 \div 4 \text{ of } 2)\}\right]$

$\Rightarrow -7 \div [5 + 1 \div 2 - \{(4 + 2) + (\frac{1}{2})\}]$

$\Rightarrow -7 \div \left[5 + 1 \div 2 - \frac{13}{2}\right]$

$\Rightarrow -7 \div -1$

$\Rightarrow 7$

62. (d) $\frac{40 + \frac{3}{4} \text{ of } 32}{37 + \frac{3}{4} \text{ of } (34-6)} = ?$

$\Rightarrow \frac{40+24}{37+21} = \frac{64}{58}$

$\Rightarrow \frac{32}{29} = 1\frac{3}{29}$

63. (c) $\because a = 535, \ b = 365$

$\Rightarrow \frac{1}{10000}[535 + 365]$

$\Rightarrow \frac{900}{10000} = 0.09$

64. (a)

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

$\left(4 \times 8 \div \frac{1}{4}\right) \times \frac{1}{8} = ?$

$\Rightarrow 1 - \frac{3}{12} + (4) \div 8 + 128 \times \frac{1}{8}$

$\Rightarrow 1 - \frac{1}{4} + \frac{4}{8} + 16$

$\Rightarrow 17 + \frac{4}{8} - \frac{1}{4}$

$\Rightarrow \frac{69}{4}$

65. (a) $\because a = 427, \ b = 325$

$\Rightarrow 100 \ (427 + 325)$

$\Rightarrow 75200$

66. (b) $7 \div [5 + 1 \div 2 - \{4 + (4 \text{ of } 2 \div 4) + (5 \div 5 \text{ of } 2)\}] = ?$

$\Rightarrow 7 \div [5 + 1 \div 2 - \{4 + 2 + \frac{1}{2}\}]$

$\Rightarrow 7 \div \left[5 + \frac{1}{2} - \frac{13}{2}\right]$

$\Rightarrow 7 \div \left[\frac{11}{2} - \frac{13}{2}\right] \Rightarrow -7$

67. (b) $(320 + 342 + 530 + 915) \div (20 + 22 - x + 18) = 43$

$\Rightarrow \frac{2107}{60 - x} = 43$

$\Rightarrow 2107 = 2580 - 43x$

$\Rightarrow 473 = 43x$

$\Rightarrow x = 11$

68. (b) $\frac{8}{13} \times \frac{15}{16} \times \frac{2}{3} - \frac{3+4}{27+64}$

$= \frac{8}{13} \times \frac{5}{8} - \frac{7}{91} = \frac{5}{13} - \frac{7}{91} = \frac{4}{13}$

69. (a)

$= 7\frac{1}{3} \div 2\frac{1}{2} \text{ of } 1\frac{3}{5} - \left(\frac{3}{8} + \frac{1}{7} \times 1\frac{3}{4}\right) - \frac{5}{24}$

$= \frac{22}{3} \div \frac{5}{2} \times \frac{8}{5} - \left[\frac{3}{8} + \frac{1}{7} \times \frac{7}{4}\right] - \frac{5}{24}$

$= \frac{22}{3} \div \frac{40}{10} - \left[\frac{3}{8} + \frac{1}{4}\right] - \frac{5}{24}$

$= \frac{11}{6} - \frac{5}{8} - \frac{5}{24}$

$= \frac{44 - 15 - 5}{24} = \frac{24}{24} = 1$

70. (a) $(0.08\% \text{ of } 0.008\% \text{ of } 8)^{\frac{1}{9}}$

$= \frac{8}{10000} \times \frac{8}{100000} \times 8$

$= \left[\left(\frac{2}{10}\right)^9\right]^{\frac{1}{9}} = \frac{2}{10} = 0.2$

71. (c) $\left\{\frac{1}{8}\left(x + \frac{1}{y}\right)^2 - \left(x - \frac{1}{y}\right)^2\right\}$

$= \left\{\frac{1}{8}\left(x^2 + \frac{1}{y^2} + \frac{2x}{y} - x^2 - \frac{1}{y^2} + \frac{2x}{y}\right)\right\}$

$= \frac{1}{8} \times \frac{4x}{y} = \frac{x}{2y}$

72. (d) Given that,

$\frac{1}{\sqrt{7 - 4\sqrt{3}}}$

$\Rightarrow \frac{1}{\sqrt{7 - 2\sqrt{12}}}$

$\Rightarrow \frac{1}{2 - \sqrt{3}} \times \frac{2 + \sqrt{3}}{2 + \sqrt{3}}$

$\Rightarrow 2 + \sqrt{3} = 3.7$

73. (a) Given that,

$\frac{0.325 \times 0.325 + 0.175 \times 0.175 - 25 \times 0.00455}{5 \times 0.0065 \times 3.25 - 7 \times 0.175 \times 0.025}$

Let,

A = 0.325, B = 0.175

Then,

$\frac{(A-B)^2}{A^2 - B^2} = \frac{A-B}{A+B}$

$\frac{0.325 - 0.175}{0.325 + 0.175} = \frac{0.15}{0.5} = 0.3$

This value lies between 0.25 to 0.35

74. (c) $5 \div [5 + 8 - \{4 + (4 \text{ of } 2 \div 4) - (2 \div 4 \text{ of } 2)\}]$

$= 5 \div \left[5 + 8 - \left\{4 + 2 - \frac{1}{4}\right\}\right]$

$= 5 \div \left[5 + 8 - \frac{23}{4}\right] = 5 \times \frac{4}{29} = \frac{20}{29}$

75. (b)

$\left(5\frac{1}{4} \div \frac{3}{7} \text{ of } \frac{1}{2}\right) \div \left(5\frac{1}{9} - 7\frac{7}{8} \div 9\frac{9}{20}\right)$

$\times \frac{11}{21} + \left(2 \div 2 \text{ of } \frac{1}{2}\right)$

$= \left(\frac{21}{4} \div \frac{3}{14}\right) \div \left(\frac{46}{9} - \frac{63}{8} \div \frac{189}{20}\right) \times \frac{11}{21} + 2$

$= \left(\frac{21}{4} \times \frac{14}{3}\right) \div \left(\frac{46}{9} - \frac{63}{8} \times \frac{20}{189}\right) \times \frac{11}{21} + 2$

$= \frac{49}{2} \times \frac{18}{77} \times \frac{11}{21} + 2 = 5$

76. (a) $(a^3 + b^3 + c^3 = 3abc)$

$$\frac{0.74 \times 1.23 \times 0.13}{(0.37)^3 + (0.41)^3 - 8(0.39)^3}$$

$$= \frac{2 \times (0.37) \times 3(0.41) \times 0.13}{(0.37)^3 + (0.41)^3 - (2 \times 0.39)^3}$$

$$= \frac{2 \times (0.37) \times 3(0.41) \times 0.13}{(0.37)^3 + (0.41)^3 - (0.78)^3}$$

$$= \frac{(0.37) \times (0.41) \times (0.78)}{-3(0.37)(0.41)(0.78)} = \frac{-1}{3}$$

77. (c) $\dfrac{\sqrt{0.6912} + \sqrt{0.5292}}{\sqrt{0.6912} - \sqrt{0.5292}}$

(divided by $\sqrt{12}$ in both numerator and denominator)

$$= \frac{\frac{\sqrt{0.6912}}{\sqrt{12}} + \frac{\sqrt{0.5292}}{\sqrt{12}}}{\frac{\sqrt{0.6912}}{\sqrt{12}} - \frac{\sqrt{0.5242}}{\sqrt{12}}}$$

$$= \frac{\sqrt{576} + \sqrt{441}}{\sqrt{576} - \sqrt{441}} = \frac{24 + 21}{24 - 21} = \frac{45}{3}$$

$$= 15$$

78. (a)

$$\left[\frac{4}{9} \div \left(\frac{3}{2} \div \frac{3}{2}\right) \times \frac{9}{25}\right] \times \left[\frac{2}{3} \text{of} \frac{4}{9} \div \left(3 \times \frac{3}{5} \text{of} \frac{4}{5}\right)\right]$$

$$= \left[\frac{4}{9} \div 1 \times \frac{9}{25}\right] \times \left[\frac{8}{27} \div \frac{36}{25}\right]$$

$$= \left[\frac{4}{9} \times \frac{9}{25}\right] \times \left[\frac{8}{27} \times \frac{25}{36}\right]$$

$$\frac{4}{25} \times \frac{50}{27 \times 9} = \frac{8}{243}$$

Required difference

$$\Rightarrow \frac{2}{9} - \frac{8}{243}$$

$$= \frac{54 - 8}{243} \Rightarrow \frac{46}{243}$$

79. (a) $\dfrac{5 - [2 + 3(2 - 2 \times 2 + 5) - 5] \div 5}{4 \times 4 \div 4 \text{of} (4 + 4 \div 4 \text{of} 4)}$

$$= \frac{\frac{19}{5}}{\frac{16}{17}} = \frac{19}{5} \times \frac{17}{16} = \frac{323}{80} = 4\frac{3}{80}$$

80. (a)

$$\frac{4.669 \times 4.669 - 9 \times (0.777)^2}{(4.669)^2 + (2.331)^2 + 14(0.667)(2.331)}$$

$$= 1 - K$$

$$\frac{(4.669)^2 - (2331)^2}{(4.669)^2 + (2.331)^2 + 2(4.669)(2.331)}$$

$$= 1 - K$$

$$= \frac{(4.669)^2 - (2331)^2}{(4.669 + 2331)^2} = 1 - K$$

$$= \frac{(4669 + 2331)(4669 - 2331)}{(4669 + 2331)(4669 + 2331)} = \frac{2338}{7000}$$

$$= 0.334$$

$$= 0.334 = 1 - K$$

$$= K = 1 - 0.334 = 0.666$$

81. (b) $\dfrac{\frac{1}{3} + \left[4\frac{3}{4} - \left(3\frac{1}{6} - 2\frac{1}{3}\right)\right]}{\left(\frac{1}{5} \text{of} \frac{1}{5} \div \frac{1}{5}\right) \div \left(\frac{1}{5} \div \frac{1}{5} \times \frac{1}{5}\right)}$

$$= \frac{\frac{1}{3} + \frac{47}{12}}{1} = 4.25$$

It lies between = (4.2 and 4.4)

82. (b) $\sqrt{11 + 2\sqrt{18}}$

$$= \sqrt{9} + \sqrt{2}$$

$$= 3 + 1.4 = 4.4$$

83. (b) $9 \times [(9 - 4) \div \{(8 \div 8 \text{ of } 4) + (4 \div 4 \text{ of } 2)\}]$

$$= 9 \times \left[5 \div \left\{\left(8 \times \frac{1}{32}\right) + \left(4 \times \frac{1}{8}\right)\right\}\right]$$

$$= 9 \times \left[5 \div \left\{\frac{1}{4} + \frac{1}{2}\right\}\right]$$

$$= 9 \times \left[5 \times \frac{4}{3}\right] = 60$$

84. (c)

$$= \frac{(0.13)^2 + (0.21)^2}{(0.39)^2 + 81(0.07)^2} \div \frac{(2.4)^4 + 3 \times (11.52) + 9}{(2.4)^6 + 6(2.4)^4 + 3 \times (17.28)}$$

$$= \frac{(0.13)^2 + (0.21)^2}{9\left[(0.13)^2 + 9(0.07)^2\right]} \div \frac{(2.4)^4 + 3 \times (11.52) + 9}{2.4^2\left[(2.4)^4 + 6(2.4)^2 + 3 \times 3\right]}$$

$$= \frac{(0.13)^2 + (0.21)^2}{9\left[(0.13)^2 + (0.21)^2\right]} \div \frac{(2.4)^4 + 3 \times (11.52) + 9}{2.4^2\left[(2.4)^4 + 3 \times 11.52 + 9\right]}$$

$$= \frac{1}{9} \div \frac{1}{5.76} = \frac{5.76}{9} = 0.64$$

Value of the expression lies between 0.6 and 0.7.

85. (b) $8 \div [(9 - 5) \div \{(4 \div 2 \text{ of } 4) - (8 \div 8 \text{ of } 16) + (4 \times 2 \div 8)\}]$

$$= 8 \div \left[4 \div \left\{\frac{1}{2} - \frac{1}{16} + \frac{1}{1}\right\}\right]$$

$$= 8 \div \left[4 \div \left\{\frac{8 - 1 + 16}{16}\right\}\right]$$

$$= 8 \div \left[4 \times \frac{16}{23}\right] = 8 \times \frac{23}{64} = \frac{23}{8}$$

86. (a) $= \dfrac{\left(3\frac{1}{3} - 2\frac{1}{2}\right) \div \frac{1}{4} \text{ of } 1\frac{1}{4}}{\frac{3}{10} + \frac{1}{6} \times \frac{1}{3}} \text{ of } \frac{4}{15}$

$$\div \frac{\frac{1}{3} \div \frac{1}{3} \text{of} \frac{1}{9}}{\frac{1}{9} \times \frac{1}{3} \div \frac{1}{6}} = \frac{\left(\frac{10}{3} - \frac{5}{2}\right) \div \frac{1}{4} \text{of} \frac{5}{4}}{\frac{3}{10} + \frac{1}{18}} \text{ of}$$

$$\frac{4}{15} \div \frac{\frac{1}{3} \div \frac{1}{27}}{\frac{1}{9} \times \frac{1}{3} \times \frac{6}{1}} = \frac{\frac{5}{6} \div \frac{5}{16}}{\frac{64}{180}} \text{ of}$$

$$\frac{4}{15} \div \frac{\frac{9}{1}}{\frac{2}{9}} = \frac{8}{3} \times \frac{180}{64} \text{of} \frac{4}{15} \div \frac{9}{1} \times \frac{9}{2}$$

$$= \frac{8}{3} \times \frac{180}{64} \times \frac{4}{15} \times \frac{2}{81} = \frac{4}{81}$$

87. (b) $\sqrt{6 - \sqrt{17 - 2\sqrt{72}}}$

$$= \sqrt{6 - \sqrt{17 - 2 \times 6\sqrt{2}}}$$

$$= \sqrt{6 - \sqrt{17 - 12 \times 1.4}}$$

$$= \sqrt{6 - \sqrt{17 - 16.8}} = \sqrt{6 - \sqrt{0.2}}$$

$$= \sqrt{6 - 0.14} = \sqrt{5.76} = 2.4$$

88. (c) $\sqrt{0.00576 \times y} = 2.4$

Squaring both sides

$$\Rightarrow \left(\sqrt{0.00576 \times y}\right)^2 = (2.4)^2$$

$$\Rightarrow 0.00576 \times y = 5.76$$

$$\Rightarrow y = 1000$$

89. (b) $\dfrac{(2.8)^3 + (2.2)^3}{(28)^2 - 28 \times 22 + 484}$

We know,

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

$$= \frac{(28)^3 + (22)^3 \times 10^{-3}}{(28)^2 - 28 \times 22 + 22^2}$$

$$= \frac{(28 + 22)\left[(28)^2 - 28 \times 22 + (22)^2\right] \times 10^{-3}}{(28)^2 - 28 \times 22 + (22)^2}$$

$$= 50 \times 10^{-3} = 0.05$$

90. (c) Solving using BODMAS rule-

$$\frac{17.35 + \frac{7}{5} \text{of} 55 - 7}{(42 \div 6 \times 8.35) - \frac{3}{7} \text{of} \left(\frac{2}{3} - \frac{1}{5}\right) + [291 \div (80 \div 8)]}$$

$$= \frac{17.35 + \frac{7}{5} \times 55 - 7}{(7 \times 8.35) - \frac{3}{7} \text{of} \left(\frac{7}{15}\right) + 29.1}$$

$$= \frac{17.35 + 77 - 7}{58.45 - \frac{1}{5} + 29.1}$$

$$= \frac{87.35}{(58.45 - 0.2 + 29.1)}$$

$$= \frac{87.35}{87.35} = 1$$

91. (d) Solving using BODMAS rule-

$$\frac{56 + \frac{2}{3} \text{ of } 27 - 8}{15 - \frac{3}{5} \text{ of } (29 - 14)}$$

$$= \frac{56 + \frac{2}{3} \times 27 - 8}{15 - \frac{3}{5} \times 15} = \frac{56 + 18 - 8}{15 - 9}$$

$$= \frac{66}{6} = 11$$

92. (b) We know, If a + b + c = 0, then
$a^3 + b^3 + c^3 = 3abc$
Here, 0.321 + 0.456 − 0.777 = 0

$$\therefore \frac{(0.321)^3 + (0.456)^3 - (0.777)^3}{0.9 \times (0.107)(0.76)(0.777)}$$

$$= \frac{-3 \times 0.321 \times 0.456 \times 0.777}{0.9 \times (0.107)(0.76)(0.777)}$$

$$= -6$$

93. (a)

$$\frac{5 - 2 \div 4 \times [5 - (3 - 4)] + 5 \times 4 \div 2 \text{ of } 4}{4 + 4 \div 8 \text{ of } 2 \times (8 - 5) \times 2 \div 3 - 8 \div 2 \text{ of } 8}$$

$$= \frac{5 - \frac{1}{2} \times 6 + \frac{5}{2}}{4 + 4 \times \frac{1}{16} \times 3 \times 2 \times \frac{1}{3} - 8 \times \frac{1}{16}}$$

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

94. (d)

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

$$= \frac{\left(\frac{7}{3} + \frac{5}{2} - \frac{1}{6}\right) \div \frac{7}{3} \times \frac{17}{3} \div \frac{5}{3} \text{ of } \frac{17}{4}}{\frac{16}{5} \div \frac{9}{2} \text{ of } \frac{16}{3} + \frac{16}{3} \times \frac{3}{4} \div \frac{8}{3}}$$

$$= \frac{\frac{14}{3} \div \frac{7}{3} \times \frac{17}{3} \div \frac{85}{12}}{\frac{16}{5} \div 24 + \frac{16}{3} \times \frac{3}{4} \times \frac{3}{8}}$$

$$= \frac{2 \times \frac{17}{3} \times \frac{12}{85}}{\frac{16}{5} \times \frac{1}{24} + \frac{3}{2}} = \frac{\frac{8}{5}}{\frac{2}{15} + \frac{3}{2}}$$

$$= \left[\frac{8}{5}\right] \times \left[\frac{30}{49}\right] = \frac{48}{49}$$

Required difference $= \frac{48}{49} - \frac{6}{7} = \frac{6}{49}$

95. (c)

$$\frac{4 - 3 \div 2 \times (4 - 2) - 3 + 4 \times 3 \div 2 + 4}{4 + 3 \div 4 \times (2 - 4) \times 4 + 3 \div 4 \text{ of } 3}$$

$$= \frac{4 - \frac{3}{2} \times 2 - 3 + 4 \times \frac{3}{2} + 4}{4 + \frac{3}{4} \times (-2) \times 4 + 3 \times \frac{1}{12}}$$

$$= \frac{4 - 3 - 3 + 6 + 4}{4 - 6 + \frac{1}{4}} = \frac{8}{-7} \times 4 = \frac{-32}{7}$$

96. (b) $\dfrac{(0.013)^3 + (0.007)(0.000049)}{(0.007)^2 + 0.013(0.013 - 0.007)}$

$$= \frac{(13)^3 + (7)^3}{(7^2 + 13^2 - 7 \times 13) \times 1000}$$

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

$$= \frac{(7 + 13)(7^2 + 13^2 - 7 \times 13)}{(7^2 + 13^2 - 7 \times 13) \times 1000}$$

$$= \frac{20}{1000} = 0.02$$

97. (a)

$$\frac{\left(1\frac{1}{9} \times 1\frac{1}{20} \div \frac{21}{38} - \frac{1}{3}\right) \div 2\frac{4}{9} \div 1\frac{7}{15} \text{ of } \frac{3}{5}}{\frac{1}{5} \text{ of } \frac{1}{5} \div \frac{1}{125} - \frac{1}{25} \div \frac{1}{5} \text{ of } \frac{1}{5}}$$

$$= \frac{\left(\frac{10}{9} \times \frac{21}{20} \times \frac{38}{21} - \frac{1}{3}\right) \div \left(\frac{22}{9} \div \frac{22}{15} \times \frac{3}{5}\right)}{\frac{1}{25} \times \frac{125}{1} - \frac{1}{25} \times \frac{25}{1}}$$

$$= \frac{\left(\frac{19}{9} - \frac{1}{3}\right) \div \left(\frac{22}{9} \times \frac{25}{22}\right)}{5 - 1}$$

$$= \frac{\frac{57 - 9}{27} \times \frac{9}{25}}{4} = \frac{\frac{48}{27} \times \frac{9}{25}}{4}$$

$$= \frac{16}{25 \times 4} = \frac{4}{25} = 0.16$$

0.16 lies between (0.15 and 0.2)

98. (d) $\sqrt{201} - \sqrt{199} = 0.10$

$\sqrt{101} - \sqrt{99} = 0.07$

$\sqrt{301} - \sqrt{299} = 0.057$

$\sqrt{401} - \sqrt{399} = 0.050$

The smallest value is $\sqrt{401} - \sqrt{399} = 0.050$

99. (c) $\sqrt{9 - 2\sqrt{11 - 6\sqrt{2}}}$

$$= \sqrt{9 - 2\sqrt{3^2 + \left(\sqrt{2}\right)^2 - 2 \times 3 \times \sqrt{2}}}$$

$$= \sqrt{9 - 2\left(3 - \sqrt{2}\right)}$$

$$= \sqrt{9 - 6 + 2\sqrt{2}}$$

$$= \sqrt{3 + 2\sqrt{2}}$$

$$= \sqrt{\left(\sqrt{2}\right)^2 + 1^2 + 2\sqrt{2}}$$

$$= \sqrt{2} + 1$$

$$= 1.4 + 1 = 2.4$$

100. (d) $\dfrac{1}{\sqrt{17 + 12\sqrt{2}}} = \dfrac{1}{\sqrt{17 + 2\sqrt{72}}}$

$$= \frac{1}{\sqrt{9} + \sqrt{8}}$$

$$= \frac{1}{\sqrt{9} + \sqrt{8}} \times \frac{\sqrt{9} - \sqrt{8}}{\sqrt{9} - \sqrt{8}} = \frac{3 - 2\sqrt{2}}{1}$$

$$= 3 - 2 \times 1.414 = 0.17$$

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