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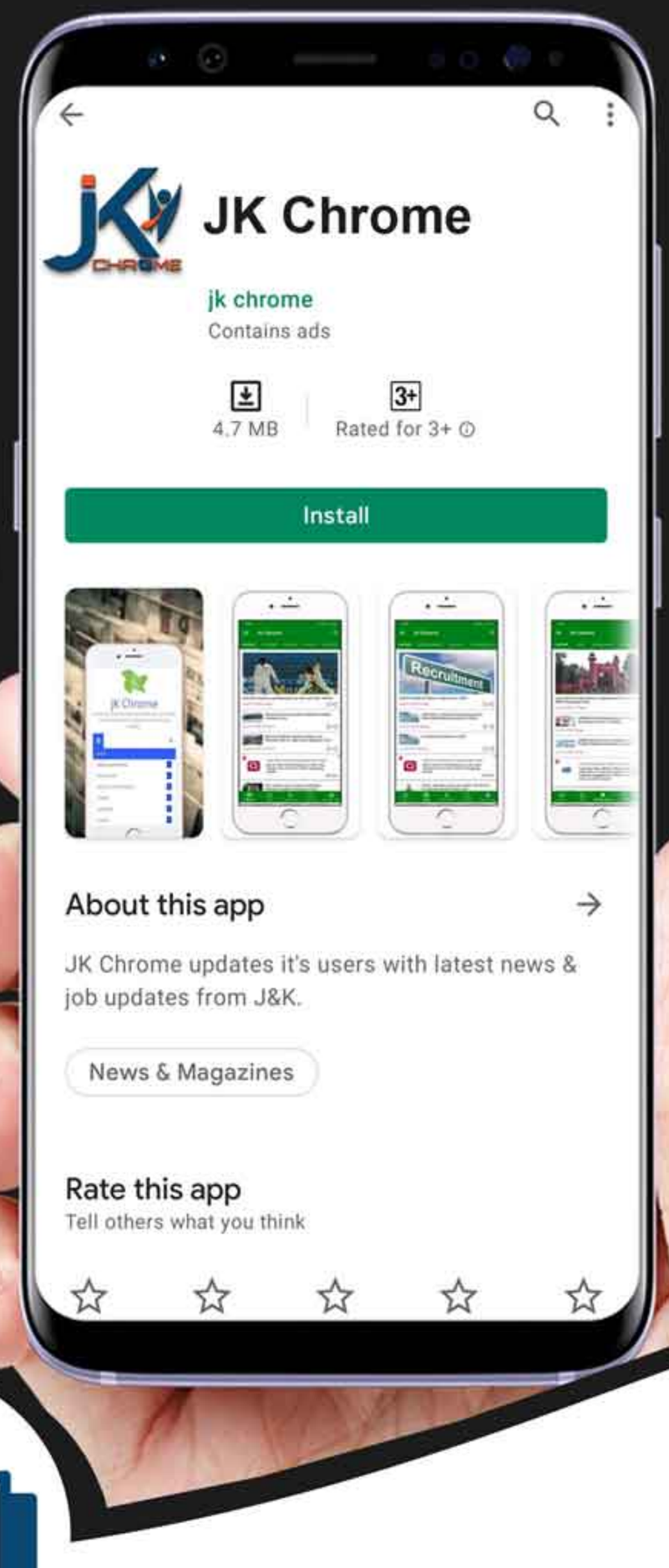

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Surds & Indices

Let n be a positive integer and a be a real number, then:

$$a^n = \frac{a \times a \times a \times .... \times a}{(n\,factor)}$$

where a^n is called "n^{th} power of a" or "a raised to the power n"

where, a is called the **base** and n is called **index or exponen**t of the power a^n.

Laws of Indices:

- $a^m \times a^n = a^{m+n}$ where and (m, n)
- $a^m \times a^n \times a^p ..... = a^{m+n+p+.....}$
- $$\frac{a^m}{a^n} = \begin{cases} a^{m-n} & if \quad m > n \\ \frac{1}{a^{n-m}} & if \quad n > m \\ 1 & if \quad m = n \end{cases}$$
- $(a^m)^n = a^{mn} = (a^n)^m$
- $a^{m^n} = a^{m \times m \times ..... n\ times} \neq (a^m)^n$
- $(ab)^n = a^n b^n$
- $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$
- $$(-a)^n = \begin{cases} a^n, when\ n\ is\ even \\ -a^n, when\ n\ is\ odd \end{cases}$$

- $a^{-n} = a^{(-1)n} = (a^{-1})^n = \left(\frac{1}{a}\right)^n = \frac{1}{a} \times \frac{1}{a} \times \frac{1}{a} \ldots\ldots n \text{ times}$
- $a^{p/q} = (a^{1/q})^p$ where p is a positive integer and q≠0
- If the index of a power is unit (i.e. 1) then the value of the power is equal to its base, i.e.

$a^1 = a, 0^1 = 0$

- $a^m = a^n \Rightarrow m = n \text{ when } a \neq 0,1$
- $a^m = b^m \Rightarrow a = b$

Surds: If a is rational and n is a positive integer and $a^{1/n} = \sqrt[n]{a}$ is **irrational**,then $\sqrt[n]{a}$ is called a surds of order n or nth root of a.

- A surd which has unity as its rational factor **(i.e., a = 1) i**s called "pure surd". e.g $\sqrt[4]{3}, \sqrt{2}, \sqrt[3]{3}$ *etc*
- A surd which has a rational factor other than unity, the other irrational, is called "**mixed surd**". e.g $3\sqrt{5}, 2\sqrt{7}, 5\sqrt[3]{7}$

- If $\sqrt[n]{a}$ is a surd it implies , a is a rational number and $\sqrt[n]{a}$ is an irrational number.

Quadratic Surd:

A surd of order 2 (i.e $\sqrt{a}$) is called a **quadratic** surd.

E.g. : $\sqrt{2} = 2^{1/2}$ is a quadratic surd but $\sqrt{4} = 4^{1/2}$ is not a quadratic surdbecause $\sqrt{4} = 2$ is a rational number. Therefore $\sqrt{4}$ is not a surd.

Cubic Surd:

A surd of order 3 is called a cubic surd. e.g. $9^{1/3}$

Important Formulae Based on Surds :

- $\sqrt[n]{a^n} = a$
- $\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$
- $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$ and $\frac{k\sqrt[n]{a}}{l\sqrt[n]{b}} = \frac{k}{l}\sqrt[n]{\frac{a}{b}}$
- $\sqrt[n]{\sqrt[m]{a}} = \sqrt[mn]{a} = \sqrt[m]{\sqrt[n]{a}}$
- $\left(\sqrt[n]{a}\right)^m = (a)^{m/n} = \left(a^m\right)^{1/n} = \sqrt[n]{a^m}$
- $\left(\sqrt[n]{a}\right)^m = (a)^{m/n} = \left(a^m\right)^{1/n} = \sqrt[n]{a^m}$
- $\sqrt{a} \times \sqrt{a} = a$
-
- $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$
- and $k\sqrt[n]{a} \times l\sqrt[n]{b} = kl\sqrt[n]{a} \cdot \sqrt[n]{b} = kl\sqrt[n]{a^n b^n}$
- $\sqrt{a^2 b} = a\sqrt{b}$
- $(\sqrt{a} + \sqrt{b})^2 = a + b + 2\sqrt{ab}$
- $(\sqrt{a} - \sqrt{b})^2 = a + b - 2\sqrt{ab}$
- $(\sqrt{a} + \sqrt{b}) \times (\sqrt{a} - \sqrt{b}) = a - b$

Similar or like Surds:

surds having same irrational factors are called similar or like surds.

e.g.3√3, 4√3, 7√3 are similar surds.

Unlike surds:

Surds having no common irrational factors are called **unlike** surds.

e.g. $3\sqrt{3}$, $7\sqrt{5}$ are unlike surds.

Comparison of Surds:

If two surds are of the same order then the one whose radicand is larger is the larger surds.

$7\sqrt{3} > 3\sqrt{3}$.

If two surds are of different order then:

Question:Which is larger $\sqrt{2}$ or $\sqrt[3]{3}$?

Sol. Given surds are of order 2 & 3 respectively whose L.C.M. is 6.

Convert each into a surd of order 6, as shown below :

$$\sqrt{2} = 2^{1/2} = 2^{\frac{1}{2}\times\frac{3}{3}} = 2^{3/6} = (2^3)^{1/6} = (8)^{1/6} = \sqrt[6]{8}$$

$$\sqrt[3]{3} = 3^{1/3} = 3^{\frac{1}{2}\times\frac{2}{2}} = 3^{2/6} = (9)^{1/6} = \sqrt[6]{9}$$

$$\sqrt[6]{9} > \sqrt[6]{8},\ so,\ \sqrt[3]{3} > \sqrt{2}$$

Some Useful Results :

(1) $if\ y = \sqrt{x+\sqrt{x+\sqrt{x+.....\infty}}}$

and $x = n(n+1)$ then $y = (n+1)$

e.g. $y = \sqrt{12+\sqrt{12+\sqrt{12+.....\infty}}}$

we have $x = 12 = 3\times 4 = n(n+1)$

$\therefore y = 4$

(2) $if\ y = \sqrt{x-\sqrt{x-\sqrt{x-.....\infty}}}$

and $x = n(n+1)$ then y=n

e.g. $y = \sqrt{12 - \sqrt{12 - \sqrt{12 - \ldots\ldots\infty}}}$

we have $x = 12 = 3 \times 4 = n(n+1)$

therefor y=3

(3) If $x = \frac{4\sqrt{ab}}{\sqrt{a}+\sqrt{b}}$

$$\frac{x+2\sqrt{a}}{x-2\sqrt{a}} + \frac{x+2\sqrt{a}}{x-2\sqrt{a}} = 2$$

(4) If $x = \frac{2\sqrt{ab}}{\sqrt{a}+\sqrt{b}}$

$$\frac{x+\sqrt{a}}{x-\sqrt{a}} + \frac{x+\sqrt{a}}{x-\sqrt{a}} = 2$$

Surds and Indices

1. By how much does $\sqrt{12} + \sqrt{18}$ exceed $\sqrt{3} + \sqrt{2}$?
(a) $2(\sqrt{3} - \sqrt{2})$ (b) $2(\sqrt{3} + \sqrt{2})$
(c) $2(\sqrt{3} + 2\sqrt{2})$ (d) $2(\sqrt{3} - 2\sqrt{2})$

2. The value of $\sqrt{5 + 2\sqrt{6}} - \frac{1}{\sqrt{5+2\sqrt{6}}}$ is:
(a) $2\sqrt{2}$ (b) $2\sqrt{3}$
(c) $1+\sqrt{5}$ (d) $\sqrt{5} - 1$

3. The value of $\sqrt{2^4} + \sqrt[3]{64} + \sqrt[4]{2^2}$ is :
(a) 12 (b) 16
(c) 18 (d) 24

4. $2\sqrt[3]{32} - 3\sqrt[3]{4} + \sqrt[3]{500}$ is equal to :
(a) $4\sqrt[3]{6}$ (b) $3\sqrt{24}$
(c) $6\sqrt[3]{4}$ (d) 916

5. Simplify : $\left(\frac{\frac{3}{2+\sqrt{3}} - \frac{2}{2-\sqrt{3}}}{2-5\sqrt{3}}\right)$
(a) $1/2 - 5\sqrt{3}$ (b) $2 - 5\sqrt{3}$
(c) 1 (d) 0

6. The value of $(243)^{0.16} \times (243)^{0.04}$ is equal to :
(a) 0.16 (b) 3
(c) 1/3 (b) 0.04

7. The value of $(256)^{0.16} \times (256)^{0.09}$ is
(a) 256.25 (b) 64
(c) 16 (d) 4

8. The simplification of $\frac{0.06\times0.06\times0.06 - 0.05\times0.05\times0.05}{0.06\times0.06+0.06\times0.05+0.05\times0.05}$
(a) 1 (b) 0.1
(c) 0.01 (d) 0.001

9. Simplify : $\frac{0.05\times0.05\times0.05 - 0.04\times0.04\times0.04}{0.05\times0.05+0.002+0.04\times0.04}$
(a) 1 (b) 0.1
(c) 0.01 (d) 0.001

10. Simplify $\frac{5.32\times56+5.32\times44}{(7.66)^2-(2.34)^2}$
(a) 7.2 (b) 8.5
(c) 10 (d) 12

11. Which one of the following is the least? $\sqrt{3}$, $\sqrt[3]{2}$, $\sqrt{2}$ and $\sqrt[3]{4}$?
(a) $\sqrt{2}$ (b) $\sqrt[3]{2}$
(c) $\sqrt{3}$ (d) $\sqrt[3]{3}$

12. Which one of the following is the biggest? $\sqrt[3]{4}$, $\sqrt[4]{6}$, $\sqrt[6]{15}$, and $\sqrt[12]{245}$.
(a) $\sqrt[3]{4}$ (b) $\sqrt[4]{6}$
(c) $\sqrt[6]{15}$ (d) $\sqrt[12]{245}$

13. Simplify (सरल करें) : $\left[\sqrt[3]{\sqrt[6]{5^9}}\right]^4 \left[\sqrt[3]{\sqrt[6]{5^9}}\right]^4$
(a) 5^2 (b) 5^4
(c) 5^8 (d) 5^{12}

14. If $27^{n+1} = (243)^3$ then the value of n
(a) 3 (b) 6
(c) 7 (d) 9

15. If $3^{x+8} = 27^{2x+1}$ the value of X is :
(a) 7 (b) 3
(c) –2 (d) 1

16. $(\sqrt{8} - \sqrt{4} - \sqrt{2})$ equals :
(a) $2 - \sqrt{2}$ (b) $\sqrt{2} - 2$
(c) 2 (d) –2

17. $8^{2/3}$ is equal to :
(a) 11/2 (b) 64/3
(c) 4 (d) 7/2

18. The simplified form of $(16^{3/2} + 16^{-3/2})$ is :
(a) 0 (b) 4097/64
(c) 1 (d) 16/4097

19. $16^{3/4}$ is equal to :
(a) $4\sqrt{2}$ (b) 8
(c) $2\sqrt{2}$ (d) 16

20. $(0.01024)^{1/5}$ is equal to :
(a) 4.0 (b) 0.04
(c) 0.4 (d) 0.00004

21. $(16^{0.16} \times 2^{0.36})$ is equal to :
(a) 2 (b) 16
(c) 32 (d) 64

22. $(64)^{-2/3} \times (1/4)^{-2}$ is equal to :
(a) 1 (b) 2
(c) 1/2 (d) 1/16

23. $\frac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}} + \frac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}$ simplifies to :
(a) $\sqrt{5}+\sqrt{6}$ (b) $2\sqrt{5}+\sqrt{6}$
(c) $\sqrt{5}-\sqrt{6}$ (d) $2\sqrt{5}-3\sqrt{6}$

24. $\left(\frac{2+\sqrt{3}}{2-\sqrt{3}} + \frac{2-\sqrt{3}}{2+\sqrt{3}} + \frac{\sqrt{3}-1}{\sqrt{3}+1}\right)$ simplifies to :
(a) $2-\sqrt{3}$ (b) $2+\sqrt{3}$
(c) $16-\sqrt{3}$ (d) $40-\sqrt{3}$

25. $\left(\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}\right)^2 + \left(\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}\right)^2$ is equal to :
(a) 64 (b) 62
(c) 66 (d) 68

26. $(6.5\times6.5 - 45.5 + 3.5\times3.5)$ is equal to :
(a) 10 (b) 9
(c) 7 (d) 6

27. $(7.5\times7.5 + 37.5 + 2.5\times2.5)$ is equal to :
(a) 100 (b) 80
(c) 60 (d) 30

28. $(36)^{1/6}$ is equal to :
(a) 1 (b) 6
(c) $\sqrt{6}$ (d) $\sqrt[3]{6}$

29. $(8/125)^{-(4/3)}$ is simplifies to :
(a) 625/16 (b) 625/8
(c) 625/32 (d) 16/625

30. The value of $(256)^{0.16} \times (16)^{0.18}$ is :
(a) 4 (b) –4
(c) 16 (d) 256

31. The value of $\sqrt{\frac{(\sqrt{12}-\sqrt{8})(\sqrt{3}+\sqrt{2})}{5+\sqrt{24}}}$ is :
(a) $\sqrt{6} - \sqrt{2}$ (b) $\sqrt{6} + \sqrt{2}$
(c) $\sqrt{6} - 2$ (d) $2 - \sqrt{6}$

32. Simplify (सरल करें) : $[64^{2/2} \times 2^{-2} \div 8^0]^{1/2}$
(a) 0 (b) 1
(c) 2 (d) ½

33. The value of $\sqrt{11 + 2\sqrt{30}} - \frac{1}{\sqrt{11+2\sqrt{30}}}$ is :
(a) $2\sqrt{5}$ (b) $2\sqrt{6}$
(c) $1+\sqrt{6}$ (d) $1+\sqrt{5}$

34. Simplify (सरल करें) $\frac{(1.5)3+(4.7)3+(3.8)3-3\times1.5\times4.7\times3.8}{(1.5)^2+(4.7)^2+(3.8)^2-1.5\times4.7-4.7\times3.8-3.8\times1.5}$
(a) 0 (b) 1
(c) 10 (d) 30

35. Simplify (सरल करें) $\frac{(625)^{\frac{1}{2}}(0.0144)^{\frac{1}{2}}+1}{(0.027)^{\frac{1}{3}}\times(81)^{\frac{1}{4}}}$
(a) 0.14 (b) 1.4
(c) 1 (d) 1.4

36. Simplify (सरल करें) $\frac{0.41\times0.41\times0.41+0.69\times0.69\times0.69}{0.41\times0.41-0.14\times0.69+0.69+0.69}$
(a) 0.28 (b) 1.41
(c) 1.1 (d) 2.8

37. Which of the following number is the least ?$(0.5)^2$, $\sqrt{0.49}$, $\sqrt[3]{0.008}$, 0.23
(a) $(0.5)^2$ (b) $\sqrt{0.49}$
(c) $\sqrt[3]{0.008}$ (d) 0.23

38. Arrange the following in descending order : $\sqrt[3]{4}$, $\sqrt{2}$, $\sqrt[6]{3}$, $\sqrt[4]{5}$
(a) $\sqrt[3]{4} > \sqrt[4]{5} > \sqrt{2} > \sqrt[5]{3}$ (b) $\sqrt[3]{5} > \sqrt[3]{4} > \sqrt[6]{3} > \sqrt{2}$
(c) $\sqrt{2} > \sqrt[4]{5} > \sqrt[3]{4} > \sqrt{2}$ (d) $\sqrt{2} > \sqrt[4]{5} > \sqrt[3]{4} > \sqrt{2}$

39. The greatest of the numbers $(2.89)^{0.5}$, $2-(0.5)^2$, $1+\frac{0.5}{1-\frac{1}{2}}$, $\sqrt{3}$
(a) $(2.89)^{0.5}$ (b) $2-(0.5)^2$
(c) 1+0.5 / 1-(1/2) (d) $\sqrt{3}$

40. Among $\sqrt{2}, \sqrt[3]{3}, \sqrt[4]{5}, \sqrt[3]{2}$ which one is the greatest ?
(a) $\sqrt[4]{5}$ (b) $\sqrt{2}$
(c) $\sqrt[3]{3}$ (d) $\sqrt[3]{2}$

41. If $(125)^{2/3} \times (625)^{-1/4} = (5)^x$, then the value of x is :
(a) 3 (b) 2
(c) 0 (d) 1

42. The value of $\frac{(243)^{0.13}\times(243)^{0.07}}{(7)^{0.25}\times(49)^{0.075}\times(343)^{0.2}}$
(a) 3/7 (b) 7/3
(c) 10/7 (d) 16/7

43. $\sqrt{\sqrt[3]{0.004096}}$ is equal to
(a) 4 (b) 0.4
(c) 0.04 (d) 0.004

44. The **approximate** value of $\frac{3\sqrt{12}}{2\sqrt{28}} \div \frac{2\sqrt{21}}{\sqrt{98}}$ is
(a) 1.0727 (b) 1.0606
(c) 1.6026 (d) 1.6007

45. $\frac{2.3\times2.3\times2.3-1}{2.3\times2.3+2.3+1}$ is equal to
(a) 1.3 (b) 3.3
(c) 0.3 (d) 2.2

46. The ascending order of $(2.89)^{0.5}$, $2-(0.5)^2$, $\sqrt{3}$ and $\sqrt[3]{0.008}$ is
(a) $2-(0.5)^2$, $\sqrt{3}$, $\sqrt[3]{0.008}$, $(2.89)^{0.5}$ (b) $\sqrt[3]{0.008}$, $(2.89)^{0.5}$, $\sqrt{3}$, $2-(0.5)^2$
(c) $\sqrt[3]{0.008}$, $\sqrt{3}$, $(2.89)^{0.5}$, $2-(0.5)^2$ (d) $\sqrt{3}$, $\sqrt[3]{0.008}$, $2-(0.5)^2$

47. The greatest one of $\sqrt{2}, \sqrt[3]{3}, \sqrt[6]{6}, \sqrt[5]{5}$ is
(a) $\sqrt{2}$ (b) $\sqrt[3]{3}$
(c) $\sqrt[6]{6}$ (d) $\sqrt[5]{5}$

48. Given $\sqrt{2} = 1.414$. The value of $\sqrt{8}+2\sqrt{32}-3\sqrt{128}+4\sqrt{50}$ is
(a) 8.484 (b) 8.526
(c) 8.426 (d) 8.876

49. If $\sqrt{15} = 3.88$, then what is the value of $\sqrt{5/3}$
(a) 1.293 (b) 1.2934
(c) 1.29 (d) 1.295

50. The rationalising factor of $3\sqrt{3}$ is
(a) 1/3 (b) 3
(c) -3 (d) $\sqrt{3}$

51. $\sqrt{2+\sqrt{2+\sqrt{2+\ldots\ldots}}}$ is equal to :
(a) $\sqrt{2}$ (b) $2\sqrt{2}$
(c) 2 (d) 3

52. The value of $2 + \sqrt{0.09} - \sqrt[3]{0.008} - 75\%$ of 2.80 is :
(a) 0 (b) 0.01
(c) -1 (d) 0.001

53. The value of $(\sqrt[3]{3.5} + \sqrt[3]{2.5})\{(\sqrt[3]{3.5})^2 - \sqrt[3]{8.75} + (\sqrt[3]{2.5})^2\}$ is :
(a) 5.375 (b) 1
(c) 6 (d) 5

54. The value of $(3+2\sqrt{2})^{-3} + (3-2\sqrt{2})^{-3}$ is
(a) 189 (b) 180
(c) 108 (d) 198

55. $\frac{\sqrt{5}}{\sqrt{3}+\sqrt{2}} - \frac{3\sqrt{3}}{\sqrt{5}+\sqrt{2}} + \frac{2\sqrt{2}}{\sqrt{5}+\sqrt{3}}$ is equal to :
(a) 0 (b) $2\sqrt{15}$
(c) $2\sqrt{10}$ (d) $2\sqrt{6}$

56. The value of $\frac{1}{\sqrt{3.25}+\sqrt{2.25}} + \frac{1}{\sqrt{4.25}+\sqrt{3.25}} + \frac{1}{\sqrt{5.25}+\sqrt{4.25}} + \frac{1}{\sqrt{6.25}+\sqrt{5.25}}$ is :
(a) 1.00 (b) 1.25
(c) 1.50 (d) 2.25

57. $\frac{3^0+3^{-1}}{3^0-3^{-1}}$ is simplified to
(a) -2 (b) -1
(c) 1 (d) 2

58. $\frac{10.3\times10.3\times10.3+1}{10.3\times10.3-10.3+1}$ is equal to
(a) 9.3 (b) 10.3
(c) 11.3 (d) 12.3

59. $\frac{1.49\times14.9-0.51\times5.1}{14.9-5.1}$ is equal to :
(a) 0.20 (b) 20.00
(c) 2.00 (d) 22.00

60. $(0.04)^{-1.5}$ on simplification gives :
(a) 25 (b) 125
(c) 250 (d) 625

61. $\frac{(0.96)^3-(0.1)^3}{(0.96)^2+0.096+(0.1)^2}$ is simplified to :
(a) 1.06 (b) 0.95
(c) 0.86 (d) 0.97

62. The value of $\frac{64-0.008}{16+0.8+0.04}$ is :
(a) 2 (b) 3.8
(c) 0.6 (d) 4.2

63. When $(4+\sqrt{7})$ is presented in the form of perfect square it will be equal to :
(a) $(2+\sqrt{7})^2$ (b) $\left(\frac{\sqrt{7}}{2}+\frac{1}{2}\right)^2$
(c) $\left\{\frac{1}{\sqrt{2}}(\sqrt{7}+1)\right\}^2$ (d) $(\sqrt{3}+4)^2$

64. The simplified form of $\frac{2}{\sqrt{7}+\sqrt{5}} + \frac{7}{\sqrt{12}-\sqrt{5}} - \frac{5}{\sqrt{12}-\sqrt{7}}$ is :
(a) 5 (b) 2
(c) 1 (d) 0

65. $(1/2)^{1/2}$ is equal to :
(a) $1/\sqrt{2}$ (b) $2\sqrt{2}$

(c) $\sqrt{2}$ (d) $\sqrt{2}$

66. $\frac{1}{\sqrt{3}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{6}}+\frac{1}{\sqrt{6}+\sqrt{7}}+\frac{1}{\sqrt{7}+\sqrt{8}}+\frac{1}{\sqrt{8}+\sqrt{9}}$ is
(a) $\sqrt{3}$ (b) $3\sqrt{3}$
(c) $3-\sqrt{3}$ (d) $5-\sqrt{3}$

67. $(16)^{0.16}\times(16)^{0.04}\times(2)^{0.2}$ is equal to :
(a) 1 (b) 2
(c) 4 (d) 16

68. Simplify (सरल करें) $\frac{1}{\sqrt{100}-\sqrt{99}}-\frac{1}{\sqrt{99}-\sqrt{98}}+\frac{1}{\sqrt{98}-\sqrt{97}}-\frac{1}{\sqrt{97}-\sqrt{96}}+\ldots+\frac{1}{\sqrt{2}-\sqrt{1}}$
(a) 10 (b) 9
(c) 13 (d) 11

69. $\left[\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}}+\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}}\right]$ in simplified form equals to
(a) 1 (b) $\sqrt{2}$
(c) $1/\sqrt{2}$ (d) 0

70. $[\sqrt[3]{2}\times\sqrt{2}\times\sqrt[3]{3}\times\sqrt{3}]$ is equal to
(a) 6^5 (b) $6^{5/6}$
(c) 6 (d) None of these

71. $\{(-2)^{-2}\}^{-2}$ is equal to :
(a) 16 (b) 8
(c) -8 (d) -1

72. The value of $\frac{0.796\times0.796-0.204\times0.204}{0.796-0.204}$ is
(a) 0.408 (b) 0.59
(c) 0.592 (d) 1

73. $\frac{(2.3)^3+0.027}{(2.3)^2-0.69+0.09}$ is equal to :
(a) 2.60 (b) 2.00
(c) 2.33 (d) 2.80

74. $\frac{5.71\times5.71\times5.71-2.79\times2.79\times2.79}{5.71\times5.71+5.71\times2.79+2.79\times2.79}$ in simplified form is :
(a) 8.5 (b) 8.6
(c) 2.82 (d) 2.92

75. The value of $\frac{(1.5)^3+(4.7)^3+(3.8)^3-3\times1.5\times4.7\times3.8}{(1.5)^2+(4.7)^2+(3.8)^2-1.5\times4.7-4.7\times3.8-3.8\times1.5}$ is :
(a) 0 (b) 1
(c) 10 (d) 30

76. $\left[\frac{(0.73)^3+(0.27)^3}{(0.73)^2+(0.27)^2-(0.73)\times(0.27)}\right]$ simplifies to (?)
(a) 1 (b) 0.4087
(c) 0.73 (d) 0.27

77. $[3-4(3-4)-1]^{-1}$ is equal to :
(a) 7 (b) -7
(c) $1/7$ (d) $-(1/7)$

78. What will be the number of two digits made from the units and tens digits of the expression $2^{12n}-6^{4n}$ where n is a positive integer ?
(a) 10 (b) 100
(c) 30 (d) 02

79. The smallest of $\sqrt{8}+\sqrt{5}$, $\sqrt{7}+\sqrt{6}$, $\sqrt{10}+\sqrt{3}$ and $\sqrt{11}+\sqrt{2}$ is :
(a) $\sqrt{8}+\sqrt{5}$ (b) $\sqrt{7}+\sqrt{6}$
(c) $\sqrt{10}+\sqrt{3}$ (d) $\sqrt{11}+\sqrt{2}$

80. Which of the following is the largest number ? $\sqrt{2}$, $\sqrt[3]{3}$, $\sqrt[4]{4}$, $\sqrt[6]{6}$
(a) $\sqrt{2}$ (b) $\sqrt[3]{3}$
(c) $\sqrt[4]{4}$ (d) $\sqrt[6]{6}$

81. Which is the greatest among($\sqrt{19}-\sqrt{17}$), ($\sqrt{13}-\sqrt{11}$), ($\sqrt{7}-\sqrt{5}$) and ($\sqrt{5}-\sqrt{3}$) ?
(a) $\sqrt{19}-\sqrt{17}$ (b) $\sqrt{13}-\sqrt{11}$
(c) $\sqrt{7}-\sqrt{5}$ (d) $\sqrt{5}-\sqrt{3}$

82. The greatest number among $\sqrt[3]{2}$, $\sqrt{3}$, $\sqrt[3]{5}$ and 1.5 is :
(a) $\sqrt[3]{2}$ (b) $\sqrt[3]{5}$
(c) $\sqrt{3}$ (d) 1.5

83. The greatest of $\sqrt{2}$, $\sqrt[6]{3}$, $\sqrt[3]{4}$, $\sqrt[4]{5}$ is
(a) $\sqrt{2}$ (b) $\sqrt[6]{6}$
(c) $\sqrt[3]{4}$ (d) $\sqrt[6]{8}$

84. If $x=\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ and $y=\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$ then $(x+y)$
(a) 8 (b) 16
(c) $2\sqrt{15}$ (d) $2(\sqrt{5}+\sqrt{3})$

85. Which of the following is closest to $\sqrt{3}$?
(a) 9/5 (b) 1.75
(c) 173/100 (d) 1.69

86. $0.75\times0.75-2\times0.75\times025+0.25\times0.25$ is equal to
(a) 250 (b) 2500
(c) 2.5 (d) 0.25

87. The greatest one of $\sqrt{4}$, $\sqrt[3]{4}$, $\sqrt[4]{6}$ and $\sqrt[6]{8}$ is
(a) $\sqrt{4}$ (b) $\sqrt[3]{4}$
(c) $\sqrt[4]{6}$ (d) $\sqrt[6]{8}$

88. $\frac{12}{3+\sqrt{5}+2\sqrt{2}}$ is equal to
(a) $1-\sqrt{5}+\sqrt{2}+\sqrt{16}$ (b) $1+\sqrt{5}+\sqrt{2}-\sqrt{10}$
(c) $1+\sqrt{5}+\sqrt{2}+\sqrt{10}$ (d) $1-\sqrt{5}-\sqrt{2}+\sqrt{10}$

89. $(3+\frac{1}{\sqrt{3}}+\frac{1}{3+\sqrt{3}}+\frac{1}{\sqrt{3}-3}$ is equal to
(a) 1 (b) 3
(c) $3+\sqrt{3}$ (d) $3-\sqrt{3}$

90. $\sqrt{8-2\sqrt{15}}$ is equal to :
(a) $\sqrt{5}+\sqrt{3}$ (b) $5-\sqrt{3}$
(c) $\sqrt{5}-\sqrt{3}$ (d) $3-\sqrt{5}$

91. $\left[8-\left(\frac{4^{\frac{9}{2}}\sqrt{2.2^2}}{2\sqrt{2^{-2}}}\right)^{\frac{1}{2}}\right]$ is equal to
(a) 32 (b) 8
(c) 1 (d) 0

92. $\frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}}-\frac{2\sqrt{6}}{\sqrt{3}+1}+\frac{2\sqrt{3}}{\sqrt{6}+2}$ is equal to
(a) 3 (b) 2
(c) 0 (d) $\sqrt{3}$

93. $\left(\frac{1}{1.4}+\frac{1}{4.7}+\frac{1}{7.10}+\frac{1}{10.13}+\frac{1}{13.16}\right)$ is equal to
(a) 1/3 (b) 5/16
(c) 3/8 (d) 41/7280

94. $\frac{137\times137+133\times133+18221}{137\times137\times137-133\times133\times133}$ is equal to
(a) 4 (b) 270
(c) 1/4 (d) 1/270

95. $\frac{2.75\times2.75\times2.75-2.25\times2.25\times2.25}{2.75\times2.75+2.75\times2.25+2.25\times2.25}$ is equal to
(a) -5 (b) 0.5
(c) -0.5 (d) 5

96. The greatest among $\sqrt{7}-\sqrt{5}$, $\sqrt{5}-\sqrt{3}$, $\sqrt{9}-\sqrt{7}$, $\sqrt{11}-\sqrt{9}$ is :
(a) $\sqrt{7}-\sqrt{5}$ (b) $\sqrt{5}-\sqrt{3}$
(c) $\sqrt{9}-\sqrt{7}$ (d) $\sqrt{11}-\sqrt{9}$

97. Greatest among the numbers $\sqrt[3]{9}$, $\sqrt{3}$, $\sqrt[4]{16}$, $\sqrt[6]{80}$
(a) $\sqrt[3]{9}$ (b) $\sqrt{3}$
(c) $\sqrt[4]{16}$ (d) $\sqrt[6]{80}$

98. The least one of $2\sqrt{3}$, $2\sqrt[4]{5}$, $\sqrt{8}$ and $3\sqrt{2}$ is
(a) $2\sqrt{3}$ (b) $2\sqrt[4]{5}$
(c) $\sqrt{8}$ (d) $3\sqrt{2}$

99. Given that $\sqrt{3} = 1.732$, the value of $\frac{3+\sqrt{6}}{5\sqrt{3}-2\sqrt{12}-\sqrt{32}+\sqrt{50}}$
(a) 4.899 (b) 2.551
(c) 1.414 (d) 1.732

100. Given that $\sqrt{5} = 2.236$ and $\sqrt{3} = 1.732$: the value of $\frac{1}{\sqrt{5}+\sqrt{3}}$ is
(a) 0.564 (b) 0.504
(c) 0.253 (d) 0.202

101. $2\sqrt[3]{32} - 3\sqrt[3]{4} \div \sqrt[3]{500} = ?$
(a) $4\sqrt[3]{6}$ (b) $3\sqrt{24}$
(c) $6\sqrt[3]{4}$ (d) 916

102. $\sqrt{12+\sqrt{12+\sqrt{12+}\ldots\ldots}}$ is equal to
(a) 3 (b) 4
(c) 6 (d) 2

103. If $a = \frac{\sqrt{3}}{2}$, then the value of $\sqrt{1+a} + \sqrt{1-a}$ is :
(a) $\sqrt{3}$ (b) $\sqrt{3}/2$
(c) $2+\sqrt{3}$ (d) $2-\sqrt{3}$

104. If $a = \frac{\sqrt{5}+1}{\sqrt{5}-1}$, $b = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, the value of $\frac{a^2+ab+b^2}{a^2-ab+b^2}$ is
(a) 3/4 (b) 4/3
(c) 3/5 (d) 5/3

105. $(0.04)^{-(1.5)}$ is equal to
(a) 25 (b) 125
(c) 60 (d) 5

106. The value of $\sqrt[3]{1372} \times \sqrt[3]{1458} \div \sqrt[3]{343}$ is
(a) 18 (b) 15
(c) 13 (d) 12

107. $\frac{2}{\sqrt{5}+\sqrt{3}} - \frac{3}{\sqrt{6}-\sqrt{3}} + \frac{1}{\sqrt{6}+\sqrt{5}}$ is equal to
(a) $-2\sqrt{6}$ (b) $-2\sqrt{5}$
(c) $-2\sqrt{3}$ (d) 0

108. $\left[\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} - \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}\right]$ simplifies to (सरल करें)
(a) $2\sqrt{6}$ (b) $4\sqrt{6}$
(c) $2\sqrt{3}$ (d) $3\sqrt{2}$

109. $\frac{1}{\sqrt{9}-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-\sqrt{4}}$ is equal to :
(a) 5 (b) 1
(c) 3 (d) 0

110. $\left(\sqrt{2} + \sqrt{7-2\sqrt{10}}\right)$ is equal to
(a) $\sqrt{2}$ (b) $\sqrt{7}$
(c) $\sqrt{5}$ (d) $2\sqrt{5}$

111. By how much does $(\sqrt{12}+\sqrt{18})$ exceed $(2\sqrt{3}+2\sqrt{2})$?
(a) 2 (b) $\sqrt{3}$
(c) $\sqrt{2}$ (d) 3

112. $\frac{(5.624)^3+(4.376)^3}{5.624\times5.624(5.624\times4.376)+4.376\times4.376}$ is equal to (के बराबर है I)
(a) 10 (b) 1.248
(c) 20.44 (d) 1

113. $\frac{(998)^2-(997)^2-45}{(98)^2-(97)^2} = ?$
(a) 1995 (b) 195
(c) 95 (d) 10

114. Given that $\sqrt{5} = 2.24$, then the value of $\frac{3\sqrt{5}}{2\sqrt{5}-0.48}$ is
(a) 0.168 (b) 1.68
(c) 16.8 (d) 168

115. Given that $\sqrt{2} = 1.414$, then the value of $\frac{1}{\sqrt{2}+1}$
(a) 0.414 (b) 2.414
(c) 3.414 (d) 5.414

116. If $\sqrt{3} = 1.732$, is given, then the value of $\frac{2+\sqrt{3}}{2-\sqrt{3}}$ is
(a) 11.732 (b) 13.928
(c) 12.928 (d) 13.925

117. If $x + \frac{1}{x} = -2$ then the value of $x^{2n+1} + \frac{1}{x^{2n+1}}$ where n is a positive integer is
(a) 0 (b) 2
(c) −2 (d) −5

118. If m and n(n > 1) are whole numbers such that $m^n = 121$, the value of $(m-1)^{n+1}$ is
(a) 1 (b) 10
(c) 121 (d) 1000

119. $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = ?$
(a) 5 (b) 4
(c) 3 (d) 2

120. $(256)^{0.16} \times (4)^{0.36}$ is equal to
(a) 64 (b) 16
(c) 256.25 (d) 4

121. The value of $\frac{(0.337+0.126)^2-(0.337-0.126)^2}{0.337\times0.126}$ is
(a) (b)
(c) (d)

122. Evaluate (सरल करें) $16\sqrt{\frac{3}{4} - 9\sqrt{\frac{4}{3}}}$ if $\sqrt{12} = 3.46$
(a) 3.46 (b) 10.38
(c) 13.84 (d) 24.22

123. If $3^{x+y} = 81$ and $81^{x+y} = 3$, then the value of x is
(a) 42 (b) 15/8
(c) 17/8 (d) 39

124. $\frac{3\sqrt{2}+2\sqrt{3}}{3\sqrt{2}-2\sqrt{3}}$ is equal to
(a) $5+2\sqrt{6}$ (b) $\frac{3+2\sqrt{6}}{2}$
(c) $5-2\sqrt{3}$ (d) $5+2\sqrt{3}$

125. Simplified form of $\left[\left(\sqrt[5]{x^{-3/5}}\right)^{-5/3}\right]^{-5}$ is
(a) x^5 (b) x^{-5}
(c) x (d) 1/x

126. $\frac{\sqrt{3}+1}{\sqrt{3}-1} + \frac{\sqrt{2}+1}{\sqrt{2}-1} + \frac{\sqrt{3}-1}{\sqrt{3}+1} + \frac{\sqrt{2}-1}{\sqrt{2}+1}$ is simplified to
(a) 10 (b) 12
(c) 14 (d) 18

127. Find the value of x in the expression $\sqrt[4]{3x+1} = 2$
(a) 3 (b) 6
(c) 4 (d) 5

128. $\frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}+\sqrt{5}} + \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}}$ is equal to :

(a)12 (b) $6\sqrt{35}$
(c) 6 (d) $2\sqrt{35}$

129. $\left(\frac{2}{\sqrt{6}+2}+\frac{1}{\sqrt{7}+\sqrt{6}}+\frac{1}{\sqrt{8}-\sqrt{7}}+2-2\sqrt{2}\right)$ is equal to
(a)0 (b) $2\sqrt{2}$
(c) $\sqrt{2}$ (d) $2\sqrt{7}$

130. $\left[\left\{\left(-\frac{1}{2}\right)^2\right\}^{-2}\right]^{-1}$ is equal to :
(a)1/16 (b) 16
(c) −(1/16) (d) -16

131. $\frac{256\times256-144\times144}{112}$ is equal to
(a) 420 (b) 400
(c) 360 (d) 320

132. [8.7×8.7+2×8.7×1.3+1.3×1.3] is equal to :
(a) 1.69 (b) 10
(c) 75.69 (d) 100

133. $\frac{(3.06)^3-(1.98)^3}{(3.06)^2+3.06\times1.98+(1.98)^2}$ is equal to :
(a) 1.08 (b) 5.04
(c)2.16 (d) 1.92

134. $\frac{3.25\times3.25+1.75\times1.75-2\times3.25\times1.75}{3.25\times3.25-1.75\times1.75}$ is simplified to
(a)0.5 (b) 0.4
(c) 0.3 (d) 0.2

135. $\frac{0.08\times0.08\times0.08+0.02\times0.02\times0.02}{0.08\times0.08-0.0016+0.02\times0.02}$ is simplified to :
(a)0.001 (b) 0.1
(c) 0.0016 (d) 0.016

136. The greatest number among 2^{60}, 3^{48},4^{36} and 5^{24} is
(a) 2^{60} (b) 3^{48}
(c) 4^{36} (d) 5^{24}

137. The greatest among the numbers $\sqrt{2}$, $\sqrt[3]{3}$, $\sqrt[4]{5}$, $\sqrt[6]{6}$ is
(a) $\sqrt{2}$ (b) $\sqrt[3]{3}$
(c) $\sqrt[6]{6}$ (d) $\sqrt[4]{5}$

138. The largest among the numbers 0.9, $(0.9)^2$, $\sqrt{0.9}$, 0.9 is :
(a)0.9 (b) $(0.9)^2$
(c) $\sqrt{0.9}$ (d) 0.9

139. $\sqrt{12+\sqrt{12+\sqrt{12+}\ldots\ldots}}$ is equal to
(a) 3 (b) 4
(c) 6 (d) 2

140. $\sqrt{3\sqrt{3\sqrt{3}\ldots\ldots}}$ is equal to
(a) $\sqrt{3}$ (b) 3
(c) $2\sqrt{3}$ (d) $3\sqrt{3}$

141. The number which when multiplied with $(\sqrt{3}+\sqrt{2})$ gives $(\sqrt{12}+\sqrt{18})$ is
(a)$3\sqrt{2}-2\sqrt{3}$ (b) $3\sqrt{2}+2\sqrt{3}$
(c) $\sqrt{6}$ (d) $2\sqrt{3}-3\sqrt{2}$

142. The value of $\frac{2+\sqrt{3}}{2-\sqrt{3}}+\frac{2-\sqrt{3}}{2+\sqrt{3}}+\frac{\sqrt{3}+1}{\sqrt{3}-1}$ is
(a) $16+\sqrt{3}$ (b)$4+\sqrt{3}$
(c)$2-\sqrt{3}$ (d) $2\sqrt{3}$

143. The square root of $14+6\sqrt{5}$
(a)$2+\sqrt{5}$ (b) $3+\sqrt{5}$
(c) $5+\sqrt{3}$ (d) $3+2\sqrt{5}$

144. The value of $\frac{1}{\sqrt{2}+1}+\frac{1}{\sqrt{3}+\sqrt{2}}+\frac{1}{\sqrt{4}+\sqrt{3}}+\cdots\ldots+\frac{1}{\sqrt{100}+\sqrt{99}}$ is
(a)1 (b) 9
(c) $\sqrt{199}$ (d) $\sqrt{99}-1$

145. $\frac{(0.05)^2+(0.41)^2+(0.073)^2}{(0.005)^2+(0.041)^2+(0.0073)^2}$ = ?
(a)10 (b) 100
(c) 1000 (d) None of these

146. The smallest among $\sqrt[6]{12}$, $\sqrt[3]{3}$, $\sqrt[4]{4}$ is :
(a) $\sqrt[6]{12}$ (b)$\sqrt[3]{3}$
(c) $\sqrt[4]{4}$ (d) All are equal

147. Among the numbers $\sqrt{2}$, $\sqrt[3]{9}$, $\sqrt[4]{16}$, $\sqrt[5]{32}$ the greatest one is
(a) $\sqrt{2}$ (b) $\sqrt[3]{9}$
(c) $\sqrt[4]{16}$ (d) $\sqrt[5]{32}$

148. The greatest among the numbers $\sqrt[4]{3}$, $\sqrt[5]{4}$ $\sqrt[10]{12}$, 1 is
(a) 1 (b) $\sqrt[5]{4}$
(c) $\sqrt[4]{3}$ (d) $\sqrt[10]{12}$

149. The greatest among the numbers $3\sqrt{2}$, $3\sqrt{7}$, $6\sqrt{5}$, $2\sqrt{20}$ is
(a)$3\sqrt{2}$ (b) $3\sqrt{7}$
(c) $6\sqrt{5}$ (d) $2\sqrt{20}$

150. The greatest among the numbers $\sqrt{0.09}$, $\sqrt[3]{0.064}$, 0.5 and 3/5
(a) $\sqrt{0.09}$ (b) $\sqrt[4]{0.064}$
(c)0.5 (d) 3/5

151. The greatest of the following numbers 0.16, $\sqrt{0.16}$, $(0.16)^2$, 0.04 is
(a) 0.16 (b) $\sqrt{0.16}$
(c) 0.04 (d) $(0.16)^2$

152. The greatest of the numbers $\sqrt[2]{8}$, $\sqrt[4]{13}$, $\sqrt[5]{16}$, $\sqrt[10]{41}$
(a)$\sqrt[4]{13}$ (b) $\sqrt[5]{16}$
(c) $\sqrt[10]{41}$ (d) $\sqrt[2]{8}$

153. If $\sqrt{2}$ = 1.4142, find the value of $2\sqrt{2}+\sqrt{2}+\frac{1}{2+\sqrt{2}}-\frac{1}{2-\sqrt{2}}$
(a) 1.4144 (b) 2.8284
(c) 28.284 (d) 2.4142

154. The square root of $\left(\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}\right)$ is
(a)$\sqrt{3}+\sqrt{2}$ (b) $\sqrt{3}-\sqrt{2}$
(c)$\sqrt{2}\pm\sqrt{3}$ (d) $\sqrt{2}-\sqrt{3}$

155. If $0.42\times100^k = 42$, then the value of k is :
(a) 4 (b) 2
(c) 1 (d) 3

156. If $2^x = 3^y = 6^{-2}$ then $\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$ is
(a) 0 (b) 1
(c) 3/2 (d) −(1/2)

157. $\left(\frac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}}+\frac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}\right)$ is simplifies to (का सरलीकरण है I)
(a)$\sqrt{5}+\sqrt{6}$ (b) $2\sqrt{5}+\sqrt{6}$
(c) $\sqrt{5}-\sqrt{6}$ (d) $2\sqrt{5}-3\sqrt{6}$

158. When simplified equal to $256^{-[4^{-1/2}]}$ is
(a) 8 (b) 1/8
(c) 2 (d) ½

159. $2\sqrt[3]{40}-4\sqrt[3]{320}+3\sqrt[3]{625}-3\sqrt[3]{5}$ is equal to
(a) $-2\sqrt[3]{340}$ (b) 0
(c) $\sqrt[3]{340}$ (d) $\sqrt[3]{660}$

160. The value of $\sqrt[3]{0.000125}$ is
(a) 0.005 (b)0.05
(c) 0.5 (d) 0.005

161. $\frac{0.355\times0.5555\times2.025}{0.225\times1.775\times0.2222}$ is equal to
(a)5.4 (b) 4.58
(c) 4.5 (d) 5.45

162. The value of $\sqrt{40+\sqrt{9\sqrt{81}}}$ is
(a) $\sqrt{111}$ (b) 9
(c) 7 (d) 11

163. If $\frac{(x-\sqrt{24})\ (\sqrt{75}+\sqrt{50})}{\sqrt{75}-\sqrt{50}} = 1$, then the value of x is
(a) $\sqrt{5}$ (b) 5
(c) $2\sqrt{5}$ (d) $3\sqrt{5}$

164. Evaluate (सरल करें) $\sqrt{20}+\sqrt{12}+\sqrt[3]{729}-\frac{4}{\sqrt{5}-\sqrt{3}}-\sqrt{81}$
(a)$\sqrt{2}$ (b) $\sqrt{3}$
(c) 0 (d) $2\sqrt{2}$

165. Let $a = \frac{1}{2-\sqrt{3}}+\frac{1}{3-\sqrt{8}}+\frac{1}{4-\sqrt{15}}$ then we have
(a) a < 18 but a ≠ 9 (b) a > 18
(c) a = 18 (d) a = 9

166. If a, b are rationals and $a\sqrt{2}+b\sqrt{3} = \sqrt{98}+\sqrt{108}-\sqrt{48}-\sqrt{72}$, then the value of a, b are respectively
(a) 1, 2 (b) 1, 3
(c)2, 1 (d) 2, 3

167. Let $\sqrt[3]{a} = \sqrt[3]{26}+\sqrt[3]{7}+\sqrt[3]{63}$ then
(a) a < 729 but a > 216 (b) a < 216
(c) a > 729 (d) a = 729

168. The value of $\frac{\sqrt{72}\times\sqrt{363}\times\sqrt{175}}{\sqrt{32}\times\sqrt{147}\times\sqrt{252}}$ is
(a)55/42 (b) 45/56
(c) 45/28 (d) 55/28

169. $2+\frac{6}{\sqrt{3}}+\frac{1}{2+\sqrt{3}}+\frac{1}{\sqrt{3}-2}$ equals to
(a) $+(2\sqrt{3})$ (b) $-(2+\sqrt{3})$
(c) 1 (d) 2

170. If $\frac{4+3\sqrt{3}}{\sqrt{7}+4\sqrt{3}} = A+\sqrt{B}$, then B – A is
(a) –13 (b) $2\sqrt{13}$
(c) 13 (d) $3\sqrt{3}-\sqrt{7}$

171. Find the simplest value of $2\sqrt{50}+\sqrt{18}-\sqrt{72}$ (given $\sqrt{2} = 1.414$).
(a) 4.242 (b) 9.898
(c) 10.6312 (d) 8.484

172. The greatest value of the following numbers 0.16, $\sqrt{0.16}$, $(0.16)^2$, 0.04 is
(a) 0.16 (b) $\sqrt{16}$
(c) 0.04 (d) $(0.16)^2$

173. Which is greater $\sqrt[3]{2}$ or $\sqrt{3}$?
(a) Cannot be compared (b) $3\sqrt{2}$
(c)$\sqrt{3}$ (d) Equal

174. The total number of prime factors in $4^{10}\times7^3\times16^2\times11\times10^2$ is
(a)34 (b)35
(c) 36 (d) 37

175. The number of prime factors in $6^{333}\times7^{222}\times8^{111}$
(a) 1221 (b) 1222
(c) 1111 (d) 1211

176. Find the value of $\sqrt{30+\sqrt{30+\sqrt{30+}\ldots.}}$
(a) 5 (b) $3\sqrt{10}$
(c) 6 (d) 7

177. The value of $\sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4}\ldots\ldots\ldots\ldots\ldots\ldots}}}$ is
(a) 2 (b) 2^2
(c) 2^3 (d) 2^5

178. $55^3+17^3-72^3+201960$ is equal to
(a) –1 (b) 0
(c) 1 (d) 17

179. What is the value of $\frac{2.75\times2.75\times2.75-2.25\times2.25\times2.25}{2.75\times2.75+2.75\times2.25+2.25\times2.25}$ is
(a)2 (b)3/2
(c) 1 (d) ½

180. The value of $\frac{(243)^{n/5}\times3^{2n+1}}{9^n\times3^{n-1}}$ is
(a) 3 (b) 9
(c) 6 (d) 12

181. The simplified value of $(\sqrt{3}+1)\ (10+\sqrt{12})\ (\sqrt{12}-2)\ (5-\sqrt{3})$ is
(a) 16 (b) 88
(c) 176 (d) 132

182. The simplified value of $(0.2)^3\times200\div2000$ of $(0.2)^2$ is
(a)1/100 (b) 1/50
(c) 1/10 (d) 1

183. What is the product of the roots of the equation $x^2-\sqrt{3}=0$?
(a) $+\sqrt{3}$ (b) $\sqrt{3}t$
(c) $-\sqrt{3}t$ (d) $-\sqrt{3}$

184. $2^{n-1}+2^{n+1} = 320$, then the value of n is
(a) 6 (b) 8
(c) 5 (d) 7

185. $4^{61}+4^{62}+4^{63}+4^{64}$ is divisible by
(a) 17 (b) 3
(c) 11 (d) 13

186. If $5\sqrt{5}\times5^3\div5^{3/2} = 5^{a+2}$, then the value of a is
(a)4 (b) 5
(c) 6 (d) 8

187. A tap is dripping at a constant rate into a container. The level (L cm) of the water in the container is given by the equation $L = 2-2^t$, where t is time taken in hours. Then the level of water in the container at the level of water in the container at the start is
(a)0 cm (b) 1 cm
(c) 2 cm (d) 4 cm

188. The value of $\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{3-\sqrt{8}}$ is
(a) 0 (b) 1
(c) 5 (d) 7

189. $\frac{\sqrt{10+\sqrt{25+\sqrt{108+\sqrt{154+\sqrt{225}}}}}}{\sqrt[3]{8}} = ?$
(a)8 (b) 4
(c) 1/2 (d) 2

190. The simplified value of $\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}}+\frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}}$

(a) 0 (b) 1
(c) $\sqrt{2}$ (d) $1/\sqrt{2}$

191. The simplified value of $\frac{\sqrt{6}+2}{\sqrt{2}+\sqrt{2+\sqrt{3}}}-\frac{\sqrt{6}-2}{\sqrt{2}-\sqrt{2-\sqrt{3}}}-\frac{2\sqrt{2}}{2+\sqrt{2}}$
(a)$2\sqrt{6}$ (b) 2
(c) $\sqrt{3}$ (d) 0

192. $\frac{6^2+7^2+8^2+9^2+10^2}{\sqrt{7+4\sqrt{3}}-\sqrt{4+2\sqrt{3}}}$ is equal to
(a) 330 (b) 355
(c) 305 (d) 366

193. (3x-2y) : (2x+3y) = 5 : 6, then one of the value of $\left(\frac{\sqrt[3]{x+\sqrt[3]{y}}}{\sqrt[3]{x}-\sqrt[3]{y}}\right)^2$ is
(a) 1/25 (b) 5
(c) 1/5 (d) 25

194. The value of $\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}++\frac{1}{\sqrt{5}+\sqrt{6}}+\frac{1}{\sqrt{6}+\sqrt{7}}+\frac{1}{\sqrt{7}+\sqrt{8}}+\frac{1}{\sqrt{8}+\sqrt{9}}$ is
(a) 2 (b) 4
(c) 0 (d) 1

195. The value of $\sqrt{72+\sqrt{72+\sqrt{72+}\ldots..}}$ is
(a) 9 (b)18
(c) 8 (d) 12

196. if $\sqrt{33}$ = 5.745, then the value of the following is approximately : $\sqrt{3/11}$
(a)0.5223 (b) 6.32
(c) 2.035 (d) 1

197. The exponential from of $\sqrt{\sqrt{2\times\sqrt{3}}}$ is
(a) $6^{-1/2}$ (b) $6^{1/2}$
(c) $6^{1/4}$ (d) 6

198. The value of $\frac{1}{1+\sqrt{2}+\sqrt{3}}+\frac{1}{1-\sqrt{2}+\sqrt{3}}$ is :
(a)$\sqrt{2}$ (b) $\sqrt{3}$
(c) 1 (d) $4(\sqrt{3}+\sqrt{2})$

199. The value of the expression $\sqrt{6+\sqrt{6+\sqrt{6+}\ldots.+upto\ \infty}}$ is
(a) 30 (b) 5
(c) 3 (d) 2

200. The value of $\frac{8\sqrt{7}}{\sqrt{5}+\sqrt{2}}-\frac{5\sqrt{5}}{\sqrt{2}+\sqrt{7}}+\frac{2\sqrt{2}}{\sqrt{7}+\sqrt{5}}$ is :
(a) 1 (b) 0
(c) $2\sqrt{3}$ (d) $\sqrt{7}$

201. $\sqrt{4032}\times\sqrt{7}$ = ?
(a)$26\sqrt{2}$ (b) $24\sqrt{7}$
(c) 168 (d) 252

202. If $11\sqrt{n}=\sqrt{112}+\sqrt{343}$, then the value of n is :
(a) 3 (b) 11
(c) 13 (d) 7

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

118.	d	119.	a	120.	d
121.	a	122.	a	123.	c
124.	a	125.	d	126.	a
127.	d	128.	a	129.	d
130.	a	131.	b	132.	d
133.	a	134.	c	135.	b
136.	b	137.	d	138.	d
139.	b	140.	b	141.	c
142.	a	143.	b	144.	b
145.	b	146.	c	147.	b
148.	b	149.	c	150.	d
151.	b	152.	d	153.	b
154.	a	155.	c	156.	a
157.	c	158.	d	159.	b
160.	b	161.	c	162.	c
163.	b	164.	c	165.	a
166.	a	167.	a	168.	d
169.	d	170.	c	171.	b
172.	b	173.	c	174.	c
175.	a	176.	c	177.	a
178.	b	179.	d	180.	b
181.	c	182.	b	183.	d
184.	d	185.	a	186.	a
187.	b	188.	c	189.	d
190.	d	191.	d	192.	a
193.	d	194.	a	195.	a
196.	a	197.	c	198.	c
199.	c	200.	b	201.	c
202.	d				

1. (c) $(\sqrt{12}+\sqrt{18})-(\sqrt{3}+\sqrt{2})$

→ 2√3 +3√2 - √3 - √2

→ √3 +2√2

2. (a) $\sqrt{(5+2\sqrt{6})}\ -\frac{1}{\sqrt{(5+2\sqrt{6})}}$

$\rightarrow (\sqrt{3}+\sqrt{2})-\frac{1}{\sqrt{3}+\sqrt{2}}$

$[\sqrt{(5+\sqrt{2})}=\sqrt{(\sqrt{3}+\sqrt{2})^2}\rightarrow\sqrt{3}+2]$

$[a^2+b^2+2ab=(a+b)^2]$

$\rightarrow \sqrt{3}+\sqrt{2}-\left(\frac{1}{\sqrt{3}+\sqrt{2}}\times\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}}\right)$

$\rightarrow \sqrt{3}+\sqrt{2}-\left(\frac{\sqrt{3}-\sqrt{2}}{3-2}\right)$

→ √3 + √2 - √3 + √2

→ 2√2

3. (a) $\sqrt{2^4}+\sqrt[3]{64}+\sqrt[4]{2^8}$

$\rightarrow 2^{4\times\frac{1}{2}}+4^{3\times\frac{1}{3}}+2^{8\times\frac{1}{4}}$

$\rightarrow 2^2+4^1+2^2$

→ 4 + 4 + 4 = 12

4. (c) $2\sqrt[3]{32}\ \ 3\sqrt[3]{4}+\sqrt[3]{500}$

$\rightarrow 2\sqrt[3]{(2\times2\times2\times4)}-3\sqrt[3]{4}+\sqrt[3]{(5\times5\times5\times4)}$

$\rightarrow 4\sqrt[3]{4}\ \ 3\sqrt[3]{4}+5\sqrt[3]{4}$

$\rightarrow 9\sqrt[3]{4}-3\sqrt[3]{4}$

$\rightarrow 6\sqrt[3]{4}$

5. (c) $\frac{\frac{3}{2+\sqrt{3}}\ \frac{2}{2-\sqrt{3}}}{2-5\sqrt{3}}$

$\rightarrow \frac{\frac{3(2-\sqrt{3})-2(2-\sqrt{3})}{(2+\sqrt{3})(2-\sqrt{3})}}{2-5\sqrt{3}}$

$\rightarrow \frac{6-3\sqrt{3}-4-2\sqrt{3}}{(2+\sqrt{3})(2-\sqrt{3})(2-5\sqrt{3})}$

$=\frac{2-5\sqrt{3}}{2-5\sqrt{3}}=1$

6. (b) $(243)^{0.16}\times(243)^{0.04}$

$(243)^{0.16+0.04}$ $[a^m\times a^n=a^{m+n}]$

$\rightarrow 243^{0.20}$

$\rightarrow =243^{\frac{20}{100}}$

$\rightarrow 243^{\frac{1}{5}}$

$\rightarrow \sqrt[5]{243}=3$

7. (d) $(256)^{0.16}\times(246)^{0.09}$

$\rightarrow (256)^{0.16+0.09}$

$\rightarrow 256^{0.25}$ $\rightarrow 256^{1/4}$

$\rightarrow \sqrt[4]{256}=4$

8. (c) $\frac{0.06\times0.06\times0.06-0.05\times0.05\times0.05}{0.06\times0.06+0.06\times0.05+0.05\times0.05}$

$\rightarrow \frac{0.06-0.05}{0.06^2-0.06\times0.05+0.05^2}$

$\rightarrow \frac{a^2-b^2}{a^2+ab+b^2}$

$\rightarrow \frac{(a-b)a^2+ab+b^2}{(a^2+ab+b^2)}$

→ a − b

So, a = 0.06 , b = 0.05

→ 0.06 - 0.05 → 0.01

9. (c)

$$\frac{0.05\times0.05\times0.05-0.04\times0.04\times0.04}{0.05\times0.05+0.002+0.04\times0.04}$$

$$\frac{(0.05)^3-(0.04)^2}{0.05^2+0.002+0.04^2}$$

a = 0.05 (Description: same as above question)
b = 0.04
→ a – b → 0.05 – 0.04
→ 0.01

10. (c) $\frac{5.324\times56+5.32\times44}{7.66^2-2.34^2}$
$\rightarrow \frac{5.32(56+44)}{(7.66-2.34)\,(7.66+2.34)}$
$\rightarrow \frac{5.32(100)}{(5.32)(10)}$
$\rightarrow \frac{100}{10} = 10$

11. (b) √3 , ^{3}√2 , √2 , ^{3}√4
$\rightarrow 3^{\frac{1}{2}}, 2^{\frac{1}{3}}, 2^{\frac{1}{2}}, 4^{\frac{1}{3}}$ (take LCM of 3 & 2)
$\rightarrow 3^{\frac{1}{2}}, 2^{\frac{2}{6}}, 2^{\frac{3}{6}}, 4^{\frac{2}{6}}$
→ ^{6}√3^3 , ^{6}√2^2 , ^{6}√2^3 , ^{6}√4^2
→ ^{6}√27 , ^{6}√4, ^{6}√8 , ^{6}√16
→ ^{3}√2

12. (a) ^{3}√4 , ^{4}√6 , ^{6}√15 , ^{12}√245
$\rightarrow 4^{\frac{1}{2}}, 6^{\frac{2}{6}}, 15^{\frac{1}{6}}, 245^{\frac{1}{12}}$ (take LCM of 3, 4, 12 & 6)
$\rightarrow 4^{\frac{4}{12}}, 6^{\frac{3}{12}}, 15^{\frac{2}{12}}, 245^{\frac{1}{12}}$
→ ^{12}√4^4 , ^{12}√6^3 , ^{12}√15^2, ^{12}√245
→ ^{12}√256, ^{12}√216 , ^{12}√225 , ^{12}√245
→ Biggest = ^{3}√4

13. (b) $[\sqrt[3]{6}\sqrt{5^9}]^4\ [\sqrt[3]{6}\sqrt{5^9}]^4$
$\rightarrow \left[5^{9\times\frac{1}{6}\times\frac{1}{3}}\right]^4 \left[5^{9\times\frac{1}{6}\times\frac{1}{3}}\right]^4$
$\rightarrow [5^{\frac{1}{2}}]^4\ [5^{\frac{1}{2}}]^4$
$\rightarrow 5^2 \times 5^2$
$\rightarrow 5^{2+2}$
$\rightarrow 5^4$

14. (a) $272^{n-1} = 243^3$
$3^{3(2n-1)} = 5^{5\times3}$
$3^{6n-3} = 3^{15}$
$6n - 3 = 15$
$6n = 18$
$n = \frac{18}{6}$, $n = 3$

15. (d) $3^{x+8} = 27^{2x+1}$
$3^{x+8} = (3^3)^{2x+1}$
$3^{x+8} = 3^{6x+3}$
$x + 8 = 6x + 3$
$5x = 5$, $x = 1$

16. (b) (√8 - √4 - √2)
→2√2 – 2 -√2
→5√2 - √2 – 2
→ √2 – 2

17. (c) $8^{2/3} \rightarrow (2^3)^{2/3}$
$\rightarrow 2^{3\frac{2}{3}}$
$\rightarrow 2^2 = 4$

18. (b) $16^{\frac{2}{3}} + 16^{-\frac{3}{2}}$
$\rightarrow 16^{3/2} + \frac{1}{16^{\frac{3}{2}}}$
$\rightarrow 4^{2\times\frac{3}{2}} + \frac{1}{4^{2\times\frac{3}{2}}}$
$\rightarrow 4^3 + \frac{1}{4^3} \rightarrow \frac{4097}{64}$

19. (b) $16^{\frac{3}{4}}$
$\rightarrow (2^4)^{3/4}$
$\rightarrow 2^{4\times\frac{3}{4}} \rightarrow 2^3 = 8$

20. (c) $(0.01024)^{1/5}$
$\rightarrow (0.4^5)^{1/5}$
$\rightarrow 0.4^{5\times\frac{1}{5}} = 0.4$

21. $(16^{0.16} \times 2^{0.36})$
$\rightarrow (2^4)^{0.16} \times (2)^{0.36}$
$\rightarrow 2^{0.64} \times 2^{0.36}$
$\rightarrow 2^{0.64+0.36}$
$\rightarrow 2^1 \rightarrow 2$

22. (a) $64^{-\frac{2}{3}} \times \left(\frac{1}{4}\right)^{-2}$
$\rightarrow (4^3)^{-\frac{2}{3}} \times \left(\frac{1}{4}\right)^{-2}$
$\rightarrow 4^{-2} \times \left(\frac{1}{4}\right)^{-2}$
$\rightarrow \left(\frac{1}{4}\right)^2 \times \left(\frac{1}{4}\right)^{-2} \left(\frac{1}{4}\right)^{2-2} \left(\frac{1}{4}\right)^{2-2}$
$\rightarrow \left(\frac{1}{4}\right)^0 = 1$

23. (c) $\left(\frac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}} + \frac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}\right)$
$\rightarrow \frac{(1+\sqrt{2})(\sqrt{5}-\sqrt{3})+(1-\sqrt{2})(\sqrt{5}+\sqrt{3})}{(\sqrt{5}+\sqrt{3})(\sqrt{5}-\sqrt{2})}$
$\rightarrow \frac{\sqrt{5}-\sqrt{3}+\sqrt{10}-\sqrt{6}+\sqrt{5}+\sqrt{3}-\sqrt{10}-\sqrt{6}}{(\sqrt{5})^2-(\sqrt{3})^2}$
$\rightarrow \frac{2\sqrt{5}-2\sqrt{6}}{2} \rightarrow \frac{2(\sqrt{5}-\sqrt{6})}{2}$
→ (√5 - √6)

24. (c) $\frac{2+\sqrt{3}}{2-\sqrt{3}} + \frac{2-\sqrt{3}}{2+\sqrt{3}} + \frac{\sqrt{3}-1}{\sqrt{3}+1}$
$\rightarrow \frac{(2+\sqrt{3})+(2-\sqrt{3})^2}{(2-\sqrt{3})(2+\sqrt{3})} + \frac{\sqrt{3}-1}{\sqrt{3}+1} \times \frac{\sqrt{3-1}}{\sqrt{3}+1}$

$\rightarrow \left(\frac{4+3+4\sqrt{3}+4+3-4\sqrt{3}}{4-3} + \frac{(\sqrt{3}-1)^2}{3+1}\right)$

$\rightarrow \left(14 + \frac{3+1-2\sqrt{3}}{2}\right)$

$\rightarrow 14 + \frac{2(2-\sqrt{3})}{2}$

$\rightarrow 14 + 2 - \sqrt{3} = 16 - \sqrt{3}$

25. (b) $\left(\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}\right)^2 \rightarrow \frac{(\sqrt{5}+\sqrt{3})^2}{(\sqrt{5}-\sqrt{3})^2}$

$\rightarrow \frac{5+3+2\sqrt{15}}{5+3-2\sqrt{15}} \rightarrow \frac{8+2\sqrt{15}}{8-2\sqrt{15}}$

$\rightarrow \frac{4+\sqrt{15}}{4-\sqrt{15}}$

Similarly : $\left(\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}\right)^2 = \frac{4-\sqrt{15}}{4+\sqrt{15}}$

Thus, the expression

$\rightarrow \frac{4-\sqrt{15}}{4+\sqrt{15}} + \frac{4+\sqrt{15}}{4-\sqrt{15}}$

$\rightarrow \frac{16+15+8\sqrt{15}+16+15-8\sqrt{15}}{16-15}$

$\rightarrow 62$

26. (b) a = 6.5

b = 3.5

$\rightarrow (a \times a - 2 \times a \times b + b \times b)$

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

$\rightarrow (a - b)^2$

$\rightarrow (6.5 - 3.5)^2 \rightarrow 3^2 = 9$

27. (a) a = 7.5 and b = 2.5

$\rightarrow a \times a + 2ab \times b$

$\rightarrow a^2 + 2ab + b^2$

$\rightarrow (a + b)^2 = (7.5 + 2.5)^2$

$\rightarrow (10)^2 \rightarrow 100$

28. (d) $36^{\frac{1}{6}} \rightarrow (6^2)^{1/6} \rightarrow 6^{2\times\frac{1}{6}}$

$\rightarrow 6^{\frac{1}{3}} \rightarrow 3\sqrt{6}$

29. (a) $\left(\frac{8}{125}\right)^{-\frac{4}{3}}$

$\rightarrow \left(\frac{125}{8}\right)^{\frac{4}{3}} \rightarrow \left[\left(\frac{5}{2}\right)^3\right]^{4/3}$

$\rightarrow \left(\frac{5}{2}\right)^4 \rightarrow \frac{625}{16}$

30. (a) $(256)^{0.16} \times (16)^{0.18}$

$\rightarrow (4)4^{4\times 0.16} \times (4)^{2\times 0.18}$

$\rightarrow 4^{0.64} \times 4^{0.36} \rightarrow 4^{0.64+0.36}$

$\rightarrow 4$

31. (c) $\frac{\sqrt{[(\sqrt{12}-\sqrt{8})(\sqrt{3}+\sqrt{2})]}}{5+\sqrt{24}}$

$\rightarrow \frac{\sqrt{(\sqrt{36}+\sqrt{24}-\sqrt{24}-\sqrt{16})}}{5+\sqrt{24}}$

$\rightarrow \frac{\sqrt{6-4}}{5+\sqrt{24}}$

$\rightarrow \sqrt{\frac{2}{5+\sqrt{24}} \times \frac{5-\sqrt{24}}{5-\sqrt{24}}}$

$\rightarrow \sqrt{\frac{\sqrt{2}(5-\sqrt{24})}{25-24}}$

$\rightarrow 2\sqrt{5-2\sqrt{6}}$

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

$\rightarrow \sqrt{2(\sqrt{3}-\sqrt{2})}$

$\rightarrow \sqrt{2}(\sqrt{3} - \sqrt{2})$

$\rightarrow \sqrt{6} - 2$

32. (c) $\left[64^{\frac{2}{3}} \times 2^{-2} \div 8^0\right]^{\frac{1}{2}}$

$\rightarrow \left((4)^{3\times\frac{2}{3}} \times \left(\frac{1}{2}\right)^2 \div 1\right)^{\frac{1}{2}}$

$\rightarrow \left[(4^2) \times \frac{1}{4} \div 1\right]^{\frac{1}{2}}$

$\rightarrow = \left(16 \times \frac{1}{4}\right)^{\frac{1}{2}} = \sqrt{4} = 2$

33. (a) $\sqrt{(11 + 2\sqrt{30})} - \frac{1}{\sqrt{11+2\sqrt{30}}}$

$\rightarrow \sqrt{((\sqrt{6})^2 + (\sqrt{5})^2 + 2\sqrt{6}.\sqrt{5})}$

$\rightarrow -\frac{1}{\sqrt{((\sqrt{6})^2 + (\sqrt{5})^2 + 2\sqrt{6}.\sqrt{5})}}$

$\rightarrow \sqrt{(\sqrt{6} + \sqrt{5})^2} - \frac{1}{\sqrt{(\sqrt{6}+\sqrt{5})^2}}$

$\rightarrow \sqrt{6} + \sqrt{5} - \frac{1}{(\sqrt{6}+\sqrt{5})}$

Rationalising above equation

$\rightarrow \sqrt{6} + \sqrt{5} - \frac{1}{\sqrt{6}+\sqrt{5}} \times \frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}+\sqrt{5}}$

$\rightarrow \sqrt{6} + \sqrt{5} - (\sqrt{6} - \sqrt{5})$

$\rightarrow \sqrt{6} + \sqrt{5} - \sqrt{6} + \sqrt{5}$

$\rightarrow 2\sqrt{5}$

34. (c)

$\left(\frac{(1.5)^3 + (4.7)^3 + (3.8)^3 - 3\times 1.5\times 1.5 + 4.7 + 3.8}{(1.5)^2 + (4.7)^2 + (3.8)^2 - 1.5\times 4.7 - 4.7\times 3.8 - 3.8\times}\right.$

$\rightarrow \frac{(1.5+(4.7)^2+(3.8)^2 - 1.5\times 4.7 - 4.7\times 3.8 - 3.8\times 1.5}{(1.5)^2 + (4.7)^2 + (3.8)^2 - 1.5\times 4.7 - 4.7\times 3.7 - 3.8\times 1.5}$

Thus, $(a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca))$

$\rightarrow 1.5 + 4.7 + 3.8 \rightarrow 10.0$

$\rightarrow 10$

35. (d) $\frac{(625)^{\frac{1}{2}} \times (0.0144)^{\frac{1}{2}} + 1}{(0.027)^{\frac{1}{3}} \times (81)^{\frac{1}{4}}}$

$\rightarrow \frac{(2.5\times 0.12) + 1}{0.3\times 3} \rightarrow \frac{(0.3+1)}{0.9} \rightarrow \frac{1.3}{0.9}$

$\rightarrow 1.44 \ldots\ldots \rightarrow 1.4$

36. (c) $\frac{0.41\times0.41\times0.41+0.69\times0.69\times0.69}{0.41\times0.41-0.41\times0.69+0.69+\times0.69}$

$\rightarrow \frac{(0.41)^3+(0.69)^3}{(0.41)^2-0.41\times0.69+(0.69)^2}$

Thus, $[a^3+b^3=(a+b)(a^2+b^2+ab)]$

$\rightarrow 0.41+0.69=1.10$

37. (c) $(0.5)^2$, $\sqrt{0.49}$, $\sqrt[3]{0.008}$, 0.23

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$0.25 \quad 0.7 \quad \mathbf{[0.2]} \quad 0.23$

$\downarrow$

Least

38. (a) $\sqrt[3]{4} \quad \sqrt{2} \quad \sqrt[6]{3} \quad 4\sqrt{5}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$4^{\frac{1}{3}} \quad 2^{\frac{1}{3}} \quad 3^{\frac{1}{6}} \quad 5^{\frac{1}{4}}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$4^{\frac{4}{12}} \quad 2^{\frac{6}{12}} \quad 3^{\frac{2}{12}} \quad 5^{\frac{3}{12}}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$\sqrt[12]{4^4} \quad \sqrt[12]{2^6} \quad \sqrt[12]{3^2} \quad \sqrt[12]{5^3}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$\sqrt[12]{256} \quad \sqrt[12]{64} \quad \sqrt[12]{9} \quad \sqrt[12]{125}$

Descending order:

$\sqrt[12]{256} < \sqrt[12]{125} < \sqrt[12]{64} > \sqrt[12]{9}$

$\sqrt[3]{4} > \sqrt[4]{5} > \sqrt{2} > \sqrt[6]{3}$

39. (c) $(2.89)^{0.5} \quad 2-(0.5)^2 \quad 1+\frac{0.5}{1-\frac{1}{2}} \quad \sqrt{3}$

$\downarrow \quad \downarrow \quad \downarrow$

$(2.89)^{\frac{5}{10}} \quad 2-(0.25) \quad 1+\frac{0.5}{0.5}$

$\downarrow \quad \downarrow \quad \downarrow$

$\sqrt{2.89} \quad 1.75 \quad 1+1 \quad 1.732$

$\downarrow$

1.7

$\downarrow$

2

$\uparrow$

Greatest

40. (a) $\sqrt{2} \quad \sqrt[3]{4} \quad \sqrt[1]{5} \quad \sqrt[3]{2}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$2^{\frac{1}{2}} \quad 2^{\frac{1}{3}} \quad 3^{\frac{1}{4}} \quad 5^{\frac{1}{3}}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$2^{6/12} \quad 3^{4/12} \quad 5^{1/4} \quad 2^{4/12}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$\sqrt[12]{2^6} \quad \sqrt[12]{3^4} \quad \sqrt[12]{5^3} \quad \sqrt[12]{2^4}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$\sqrt[12]{64} \quad \sqrt[12]{81} \quad \sqrt[12]{125} \quad \sqrt[12]{16}$

$\uparrow$

Greatest

41. (d) $125^{2/3} \times 625^{-¼} = 5^x$

$5^{3\times2/3} \times 5^{4x-1/4} = 5^x$

$5^2 \times 5^{-1} = 5^x$

$5^{2-1} = 5^x$

$x = 2, \; x = 1$

42. (a) $\frac{(243)^{0.13}\times(243)^{0.07}}{7^{0.25}\times49^{0.075}\times343^{0.2}}$

$\rightarrow \frac{243^{0.13+0.07}}{7^{0.25}\times7^{2\times0.075}\times7^{3\times0.2}}$

$\rightarrow \frac{3^{5\times0.20}}{7^{0.25+0.150+0.6}} \rightarrow \frac{3^1}{7^1} = \frac{3}{7}$

43. $\sqrt{\sqrt[3]{0.004096}}$

$\rightarrow \sqrt{0.16} \quad (16^3 = 4096)$

$\rightarrow \sqrt{(0.4\times0.4)}$

$\rightarrow 0.4$

44. (b) $\frac{3\sqrt{12}}{2\sqrt{28}} = \frac{2\sqrt{21}}{\sqrt{98}}$

$= \frac{3\times2\times\sqrt{3}}{2\times2\sqrt{7}} \div \frac{2\times\sqrt{3}\times\sqrt{7}}{7\sqrt{2}}$

$\rightarrow \frac{3\times2\times\sqrt{3}}{2\times2\times\sqrt{7}} \div \frac{7\times\sqrt{2}}{2\times\sqrt{3}\times\sqrt{7}} \rightarrow \frac{3\sqrt{2}}{4}$

$\rightarrow \frac{3\times1.414}{4} = 1.0605$

$\rightarrow$ Approx = 1.0605

45. (a) $\frac{2.3\times2.3\times2.3-1}{2.3\times2.3+2.3+1}$

$a = 2.3$

$b = 1$

$\rightarrow \frac{(a^3-b^3)}{(a^2+ab+b^2)}$

$\rightarrow \frac{(a-b)(a^2+ab+b^2)}{(a^2+ab+b^2)}$

$\rightarrow 2.3-1 = 1.3$

46. (b)

$(2.89)^{0.5} \quad 2-(0.5)^2 \quad \sqrt{3} \quad \sqrt[3]{0.008}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$2.89^{1/2} \quad 2-0.25 \quad 1.732 \quad 0.2$

$\downarrow \quad \downarrow$

$\sqrt{2.89} \quad 1.75$

$\downarrow$

1.7

Ascending order:

$0.2 < 1.7 < 1.732 < 1.75$

$\downarrow \quad \downarrow \quad \downarrow$

↓

$\sqrt[3]{0.008} < 2.89^{0.5} < \sqrt{3} < 2 - (0.5)^2$

47. (b) $\sqrt{2} \to 2^{1/2} \to 2^{15/30} = \sqrt[30]{2^{15}}$

$= \sqrt[30]{32768}$

$\sqrt[3]{3} \to 3^{1/3} \to 3^{10/30} = \sqrt[30]{2^{15}}$

$= \sqrt[30]{59049}$

$\sqrt[6]{6} \to 6^{1/6} \to 6^{5/30} = \sqrt[30]{6^5}$

$= \sqrt[30]{7776}$

$\sqrt[5]{5} \to 5^{1/5} \to 5^{6/30} = \sqrt[30]{5^6}$

$= \sqrt[30]{15625}$

So, $\sqrt[3]{3}$ is the greatest

48. (a) $\sqrt{3} = 1.414$

$\to \sqrt{8} + 2\sqrt{32} - 3\sqrt{128} + 4\sqrt{50}$

$\to 2\sqrt{2} + 2 \times 4\sqrt{2} - 3 \times 8\sqrt{2} + 4 \times 5\sqrt{2}$

$\to 2\sqrt{2} + 8\sqrt{2} - 24\sqrt{2} + 20\sqrt{2}$

$\to 6\sqrt{2}$

$\to 6 \times 1.414 \to 8.484$

49. (a) $\frac{\sqrt{5}}{\sqrt{3}} \to \frac{\sqrt{5\times3}}{\sqrt{3\times3}} = \frac{\sqrt{15}}{\sqrt{9}}$

$= \frac{\sqrt{15}}{3}$

$\to \frac{3.88}{3} = 1.29\ 3$

50. (d) $3\sqrt{3}\ \sqrt{3} = 3 \times 3 = 9$

Thus, Required rationalising factor is $\sqrt{3}$

51. (c) $x = \sqrt{2 + \sqrt{2} + \sqrt{2} + \ldots\ldots}$

$x^2 = 2 + \sqrt{2} + \sqrt{2} + \ldots\ldots$

$x^2 = 2 + x$

$x^2 - x - 2 = 0$

$x^2 - 2x + x - 2 = 0$

$x(x-2) + 1(x-2) = 0$

$(x+1)(x-2) = 0$

$x = 2$

Shortcut method

When the question is in this form

i.e. $\sqrt{x + \sqrt{x} + \sqrt{x}} \ldots\ldots\ldots$

Then factor the x n1 < n2

n1 n2

mi. diff.

So n1 is answer $\sqrt{2 + \sqrt{2 + 2}}$

[2] × 1

52. (a)

$2 + \sqrt{0.09} - \sqrt[3]{0.008} - 75\%\ \text{of}\ 2.80$

$\to 2 + 0.3 - 0.2 - \left(\frac{3}{4} \times 2.80\right)$

$\to 2 + 0.3 - 0.2 - 2.10$

$\to 2.3 - 2.3 = 0$

53. (c) $\left(\sqrt[3]{3.5} + \sqrt[3]{2.5}\right)$

$\left\{\left(\sqrt[3]{3.5}\right)^2 - \left(\sqrt[3]{8.75}\right) + \left(\sqrt[3]{2.5}\right)^2\right\}$

$x = \left(\sqrt[3]{3.5}\right)$

$y = \left(\sqrt[3]{2.5}\right)$

$\to (x + y)(x^2 - xy + y^2)$

$\to x^3 + y^3$

$\to \left(\sqrt[3]{3.5}\right)^{-3} + \left(3 - 2\sqrt{2}\right)^{-3}$

54. (d) $(3 + 2\sqrt{2})^3 + (3 - 2\sqrt{2})^{-3}$

$\to \left(\frac{1}{3+2\sqrt{2}}\right)^3 + \left(\frac{1}{3-2\sqrt{2}}\right)^3$

$\to \left(\frac{1}{(3+2\sqrt{2})} \times \frac{3-2\sqrt{2}}{3-2\sqrt{2}}\right)^3 + \left(\frac{1}{(3+2\sqrt{2})} \times \frac{3-2\sqrt{2}}{3-2\sqrt{2}}\right)^3$

$\to \left(\frac{3-2\sqrt{2}}{9-8}\right)^3 + \left(\frac{3+2\sqrt{2}}{9-8}\right)^3$

$\to (3 - 2\sqrt{2})^3 + (3 + 2\sqrt{2})^3$

$a = 3 - 2\sqrt{2}$

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

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

$\to (3 - 2\sqrt{2} + 3 + 2\sqrt{6})(17 + 17 - 1)$

$\to (6)(33)$

$\to 198$

55. (a) $\frac{\sqrt{5}}{\sqrt{3}+\sqrt{2}} - \frac{3\sqrt{3}}{\sqrt{5}+\sqrt{2}} + \frac{2\sqrt{2}}{\sqrt{5}+\sqrt{3}}$

$\to \frac{\sqrt{5}}{\sqrt{3}+\sqrt{2}} \times \frac{(\sqrt{3}-\sqrt{2})}{\sqrt{3}-\sqrt{2}}$

$\left(\frac{3\sqrt{3}}{\sqrt{5}+\sqrt{2}} \times \frac{\sqrt{5}-\sqrt{2}}{\sqrt{3}-\sqrt{2}}\right) + \frac{2\sqrt{5}}{\sqrt{5}+\sqrt{3}} \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

$\to \frac{\sqrt{15}-\sqrt{10}}{3-2} - \frac{3\sqrt{3(\sqrt{5}-\sqrt{2})}}{5-2} + \frac{2\sqrt{2(\sqrt{5}-\sqrt{3})}}{5-3}$

$\to \sqrt{15} - \sqrt{10} - (\sqrt{15} - \sqrt{6}) + \sqrt{10} - \sqrt{6}$

$\to \sqrt{15} - \sqrt{10} - \sqrt{15} + \sqrt{6} + \sqrt{10} - \sqrt{6}$

$\to 0$

56. (a) $\frac{1}{\sqrt{3.25}+\sqrt{2.25}} \times \frac{\sqrt{3.25}-\sqrt{2.25}}{\sqrt{3.25}-\sqrt{2.25}}$

$\to \frac{\sqrt{3.25}-\sqrt{2.25}}{3.25-2.25}$

$\to \sqrt{3.25} - \sqrt{2.25}$ ..... (i)

$\to \frac{1}{\sqrt{4.25}+\sqrt{3.25}}$

$= \sqrt{4.25} - \sqrt{3.25}$ ..... (ii)

$\to \frac{1}{\sqrt{5.25}+\sqrt{4.25}}$

$\to \sqrt{5.25} - \sqrt{4.25}$ ..... (iii)

$\to \frac{1}{\sqrt{6.25}+\sqrt{5.25}}$

$\to \sqrt{6.25} - \sqrt{5.25}$ ..... (iv)

→ Now add all them

→ √3.25 - √2.25 + √4.25 - √3.25
+ √5.25 - √4.25 + √6.25 - √5.25
→ √6.25 - √2.25 → 2.5 – 1.5 = 1

57. (a) $\frac{3^0+3^{-1}}{3^{-1}-3^0}$

$\rightarrow \frac{1+\frac{1}{3}}{\frac{1}{3}-1} = \frac{\frac{4}{3}}{-\frac{2}{3}}$ = - 2

58. (c) $\frac{10.3\times10.3\times10.3+1}{10.3\times10.3-10.3+1}$

$\rightarrow \frac{10.3^3+1^3}{(10.3)^3-10.3+(1)^2}$

$\rightarrow \frac{10.3+1 \quad (10.3)^2+(1)^2-10.3\times1}{(10.3)^2-10.3+1^2}$

→ 10.3 + 1 → 11.3

59. (c) $\frac{1.16\times14.9-0.51\times5.1}{14.9-5.1}$

$\rightarrow \frac{\frac{149^2}{1000}-\frac{51^2}{1000}}{(\frac{149-51}{10})}$

$\rightarrow \frac{\frac{1}{1000}(149^2-51^2)}{\frac{1}{10}(149-51)}$

$\rightarrow \frac{1(149-51)(149+51)}{100\,(149-51)}$

$\rightarrow \frac{200}{100} = 2$

60. (b) $(0.04)^{-1.5}$

$\rightarrow \left(\frac{1}{0.04}\right)^{\frac{15}{10}}$

$\rightarrow \left(\frac{1}{(0.2)^2}\right)^{\frac{3}{2}}$

$\rightarrow \frac{1}{(0.2)^{2\times\frac{3}{2}}}$

$\rightarrow \frac{1}{(0.2)^3} \rightarrow \frac{1}{0.008}$

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

61. (c) $\frac{0.96^3-0.1^a}{0.96^2+0.096+0.1^2}$

→ a = 0.96
→ b = 0.1

$\rightarrow \frac{a^3-b^3}{a^2+ab+b^2}$

$\rightarrow \frac{a-b\,(a^2+b^2+ab)}{a^2+ab+b^2}$

→ a – b
→ 0.96 – 0.1 = 0.86

62. (b) $\frac{64-0.008}{16+0.8+0.04}$

$\rightarrow \frac{(4)^3-(0.2)^3}{(4)^2+4\times0.2+(0.2)^2}$

$\rightarrow \frac{(4-0.2)(4^2+0.2^2+4\times0.2)}{4^2+4\times0.2+0.2^2}$

→ 4 - 0.2 = 3.8

63. (c) 4 + √7

$\rightarrow \frac{8+2\sqrt{7}}{2}$

$\rightarrow \frac{\sqrt{7^2}+1+2\sqrt{7}.1}{2}$

$\rightarrow (\frac{\sqrt{7}+1)^2}{(\sqrt{2})^2} \rightarrow \left\{\frac{1}{\sqrt{2(\sqrt{7}+1)}}\right\}^2$

64. (d) $\frac{2}{\sqrt{7}+\sqrt{5}}+\frac{7}{\sqrt{12}-\sqrt{5}}-\frac{5}{\sqrt{12}-\sqrt{7}}$

$\rightarrow \frac{2}{\sqrt{7}+\sqrt{5}}\times\frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}-\sqrt{5}}+\frac{7}{\sqrt{12}-\sqrt{5}}\times\frac{\sqrt{12}+\sqrt{5}}{\sqrt{12}+\sqrt{5}}$
$-\left(\frac{5}{\sqrt{12}-\sqrt{7}}\times\frac{\sqrt{12}+\sqrt{5}}{\sqrt{12}+\sqrt{5}}\right)$

$\rightarrow \frac{2(\sqrt{7}-\sqrt{5})}{2}+\frac{7(\sqrt{12}+\sqrt{5})}{7}-\left(\frac{5(\sqrt{12}+\sqrt{7})}{5}\right)$

→ √7 - √5 + √12 + √5 - √12 - √7
= 0

65. (a) $\left(\frac{1}{2}\right)^{\frac{1}{2}}$

$\rightarrow \sqrt{\frac{1}{2}} \rightarrow \frac{1}{\sqrt{2}}$

66. (c) $\frac{1}{\sqrt{3}+\sqrt{4}}$

$\rightarrow \frac{1}{\sqrt{4}+\sqrt{3}\times}\times\frac{\sqrt{4}-\sqrt{3}}{\sqrt{4}-\sqrt{3}}$

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

→ √4 - √3

Similarly $\rightarrow \frac{1}{\sqrt{4}+\sqrt{5}} = \sqrt{5}-\sqrt{4}$

$\rightarrow \frac{1}{\sqrt{5}+\sqrt{6}} \rightarrow \sqrt{6}-\sqrt{5}$

$\rightarrow \frac{1}{\sqrt{6}+\sqrt{7}} \rightarrow \sqrt{7}-\sqrt{6}$

$\rightarrow \frac{1}{\sqrt{7}+\sqrt{8}} = \sqrt{8}-\sqrt{7}$

$\rightarrow \frac{1}{\sqrt{8}-\sqrt{9}} \rightarrow \sqrt{9}-\sqrt{8}$

Now put values

→ √4 - √3 + √5 - √4 + √6 - √5 + √7 - √6 + √8 - √7 + √9 - √8
→ √9 - √3
→ 3 - √3

67. (b) $(16)^{0.16} \times (16)^{0.04} \times (0.02)^{0.2}$
→ $16^{0.16+0.04} \times 2^{0.2}$
→ $(2)^{0.8} \times 2^{0.2}$
→ $2^{0.8+0.2}$
→ $2^1 = 2$

68. (d) $\frac{1}{\sqrt{100}-\sqrt{99}} \times \frac{\sqrt{100}+\sqrt{99}}{\sqrt{100}+\sqrt{99}}$
→ $\frac{\sqrt{100}-\sqrt{99}}{1} \rightarrow \sqrt{100}-\sqrt{99}$
Similarly
→ $\frac{1}{\sqrt{99}-\sqrt{98}} \rightarrow \sqrt{99}+\sqrt{98}$
→ $\frac{1}{\sqrt{98}-\sqrt{97}} \rightarrow \sqrt{98}+\sqrt{97}$
…… and so on
Now, expression:
→√100 + √99 - √99 - √98 + √98 + √97 … + √2 + 1
→ √100 + 1 → 10 + 1 = 11

69. (c) $\left(\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}}\right)$
→ $\frac{1}{(\sqrt{2}+\sqrt{3})-(\sqrt{5})} \times \frac{\sqrt{2}+\sqrt{3}+(\sqrt{5})}{\sqrt{2}+\sqrt{3}+(\sqrt{5})}$
→ $\frac{\sqrt{2}+\sqrt{3}+\sqrt{5}}{2+3+2\sqrt{6}-5} \rightarrow \frac{\sqrt{2}+\sqrt{3}+\sqrt{5}}{2\sqrt{6}}$
Similarly
$\frac{1}{\sqrt{2}-\sqrt{3}-(\sqrt{5})} + \frac{(\sqrt{2}-\sqrt{3})+(\sqrt{5})}{(\sqrt{2}-\sqrt{3})+(\sqrt{5})}$
→ $\frac{\sqrt{2}-\sqrt{3}+\sqrt{5}}{-2\sqrt{6}}$
Now put the value in question
→ $\frac{(\sqrt{2}+\sqrt{3})+(\sqrt{5})}{(2\sqrt{6})} - \frac{(\sqrt{2}+\sqrt{3})+(\sqrt{5})}{(2\sqrt{6})}$
→ $\frac{\sqrt{2}+\sqrt{3}+\sqrt{5}-\sqrt{2}+\sqrt{3}-\sqrt{5}}{2\sqrt{6}}$
→ $\frac{2\sqrt{3}}{2\sqrt{6}} \rightarrow \frac{1}{2}$

70. (b) $\sqrt[3]{2} \times \sqrt{2} \times \sqrt[3]{3} \times \sqrt{3}$
→ $2^{1/3} \times 2^{1/2} \times 3^{1/3} \times 3^{1/2}$
→ $2^{5/6} \times 3^{5/6} \rightarrow 6^{5/6}$

71. (a)
$\{(-2)^{(-2)}\}^{-2}$
→ $\frac{1}{\{(-2)^{(-2)}\}^2}$
→ $\frac{1}{(12)^{-4}}$
→ $\frac{1}{(-2)^{-4}}$
→ $(-2)^4 = 16$

72. (d) 0.796 = a, 0.204 = b
According to the question
→ $\frac{a^2-b^2}{a-b} \rightarrow \frac{(a-b)(a+b)}{(a-b)}$
→ a +b
→ 0.796 + 0.204
→ 1.000

73. (a) $\frac{(2.3)^3+0.027}{(2.3)^2-0.69+0.09}$
→ $\frac{(2.3)^3+(0.3)^2}{(2.3)^3+0.69+(0.3)^2}$
→ a = 2.3, b = 0.3
→ $\frac{a^3+b^3}{a^2-ab+b^2}$
→ $\frac{(a+b)(a^2+b^2-ab)}{(a^2-ab+b^2)}$
→ a + b
→ 2.3 + 0.3
→ 2.60

74. (d) a = 5.71, b = 2.79
→ $\frac{a\times a\times a-b\times b\times b}{a\times a+a\times b+b\times b}$
→ $\frac{a^3+b^3}{a^2-ab+b^2}$
→ $\frac{(a-b)(a^2+b^2+ab)}{(a^2+ab+b^2)}$
→ (a - b)
→ 5.71 – 2.79
→ 2.92

75. (c) $\frac{(1.5)^3+(4.7)^3+(3.8)^3}{(1.5)^2+(4.7)^2+(3.8)^2-1.5\times4.7}$ …..
$-\frac{3\times1.5\times4.7\times3.8}{-4.7\times3.8-3.8\times1.5}$
→ a = 1.5 →b = 4.7
→ c = 3.8
→ $\frac{a^3+b^3+3abc}{a^2+b^2+c^2-ab-bc-ca}$
→ a+ b +c
→ 1.5 + 4.7 + 3.8 = 10.0 → 10

76. (a) a = 0.73, b = 0.27
→ $\frac{a^3+b^3}{a^2+b^2-ab}$
$\frac{(a+b)(a^2+b^2-ab)}{(a^2+b^2-ab)}$

→ a + b → 0.73 + 0.27 = 1

77. (c) $[3-4(3-4)^{-1}]^{-1}$

→ $[3-4(-1)^{-1}]^{-1}$

→ $\left[3-\frac{4}{(-1)^{-1}}\right]^{-1}$

→ $3+4^{-1}$

→ $7^{-1} = \frac{1}{7}$

78. (b) $2^{12n} - 6^{4n}$

→ $(2^3)^{4n} - 6^{4n}$ → $8^{4n} - 6^{4n}$

→ $(8^2)^{2n} - (6^2)^{2n}$

→ $64^{2n} - 36^{2n}$ $\{n = 1\}$

→ $64^2 - 36^{2n}$ =

→ (64 + 36) (64 – 36)

→ 100 × 28, → 100 Ans.

79. (d) √8 + √5 = $\left(\sqrt{8}+\sqrt{5}\right)^2$

= 8 + 5 + 2√40 = 13 + 2√40

(√7 + √6) → $(\sqrt{7}+\sqrt{6})^2$ → $7+6+2\sqrt{42}$

13 + 2√42

→ (√10 + √3) → $(\sqrt{10}+\sqrt{3})^2$

→ 10 + 3 + 2√30 → 13 + 2√30

→ √11 + √2 → $(\sqrt{11}+\sqrt{2})^2$

→ 11 + 2 + 2√22 → 13 + 2√22

√11 + √2

80. (b)

√2 = $2^{1/2}$ → $2^{6/12}$ → $2^{6/12}$ → $\sqrt[12]{2^6}$ → $\sqrt[12]{64}$

→ $\sqrt[3]{3}$ = $3^{1/3}$ → $3^{4/12}$ → $\sqrt[12]{3^4}$ → $\sqrt[12]{81}$

→ $\sqrt[4]{4}$ = $4^{1/4}$ → $4^{3/12}$ → $\sqrt[12]{6^2}$ → $\sqrt[12]{36}$

81. (d) (√19 - √17) → (√19 - √17) × $\frac{\sqrt{19}+\sqrt{17}}{\sqrt{19}+\sqrt{17}}$ → $\frac{19-17}{\sqrt{19}+\sqrt{17}} = \frac{2}{\sqrt{19}+\sqrt{17}}$

Similarly (√13 - √11) → $\frac{2}{\sqrt{13}+\sqrt{11}}$

(√5 - √3) → $\frac{2}{\sqrt{5}+\sqrt{3}}$

Largest + (Because, Same Numerator is divided by Smallest denominator)

82. (c)

$\sqrt[3]{2}$ √3 $\sqrt[3]{5}$ 1.5

↓ ↓ ↓ ↓

$2^{1/3}$ $3^{1/2}$ $5^{1/3}$

↓ ↓ ↓ ↓

$2^{2/6}$ $3^{3/6}$ $5^{2/6}$ $1.5^{6/6}$

↓ ↓ ↓ ↓

$\sqrt[6]{2^2}$ $\sqrt[6]{3^3}$ $\sqrt[6]{5^2}$ $\sqrt[6]{1.5^6}$

↓ ↓ ↓ ↓

$\sqrt[6]{4}$ $\sqrt[6]{27}$ $\sqrt[6]{25}$ $\sqrt[6]{11.35}$

↓

Largest

83. (c)

√2 6√3 3√4 4√5

↓ ↓ ↓ ↓

$2^{1/2}$ $3^{1/6}$ $4^{1/3}$ $5^{1/4}$

↓ ↓ ↓ ↓

$2^{6/12}$ $3^{2/12}$ $4^{4/12}$ $5^{3/12}$

↓ ↓ ↓ ↓

$(2^6)^{\frac{1}{12}}$ $(3^2)^{\frac{1}{12}}$ $(4^4)^{\frac{1}{12}}$ $(5^3)^{\frac{1}{12}}$

↓ ↓ ↓ ↓

$(64)^{\frac{1}{12}}$ $(9)^{\frac{1}{12}}$ $(256)^{\frac{1}{12}}$ $(125)^{\frac{1}{12}}$

↓

Largest

84. (a) x = $\frac{\sqrt{3}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}} \rightarrow \frac{(\sqrt{5}+\sqrt{3})^2}{2}$

→ Similarly y = $\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} \rightarrow \frac{(\sqrt{5}-\sqrt{3})^2}{2}$

→ x + y

→ $\frac{5+3+2\sqrt{15}+5+3-2\sqrt{15}}{2}$

→ $\frac{16}{2} = 8\ Ans.$

85. (c) √3 = 1.732 → $\frac{173}{100}$ $Ans.$

86. (d) 0.75 = a, 0.25 = b

→ a × a – 2 × a × b + b × b

→ $a^2 - 2ab + b$ → (a - b)^2

→ $(0.75-0.25)^2$

→ $(0.50)^2$ = 0.2500 Ans.

87. (a)

√4 3√4 4√6 6√8

↓ ↓ ↓ ↓

$4^{1/2}$ $4^{1/3}$ $6^{1/4}$ $8^{1/4}$

↓ ↓ ↓ ↓

12√46 12√44 12√63 12√82

↓ ↓ ↓ ↓

$\sqrt[12]{4096}$ $\sqrt[12]{256}$ $\sqrt[12]{216}$ $\sqrt[12]{64}$

↓

Largest

Ans. √4

88. (b) $\frac{12}{3+\sqrt{5}+2\sqrt{2}}$

→ $\frac{12(3+\sqrt{5}-2\sqrt{2})}{[(3+\sqrt{5})+2\sqrt{2}][(3+\sqrt{5})-2\sqrt{2}]}$

→ $\frac{12(3+\sqrt{5}-2\sqrt{2})}{9+5+6\sqrt{5}-8}$

→ $\frac{12(3+\sqrt{5}-2\sqrt{2})}{6\sqrt{5}+6} = \frac{2(3+\sqrt{5}-2\sqrt{2})}{\sqrt{5}+1}$

→ $\frac{2(3+\sqrt{5}-2\sqrt{2})(\sqrt{5}-1)}{(\sqrt{5}-1)(\sqrt{5}+1)}$

→ $\frac{2(3\sqrt{5}+5-2\sqrt{10}-3-\sqrt{5}+2\sqrt{2})}{5-1}$

→ $\frac{2(2\sqrt{5}+2\sqrt{2}-2\sqrt{10}+2)}{4}$

$\rightarrow \frac{2\times2(\sqrt{5}+\sqrt{2}-\sqrt{10}+1)}{4}$

$\rightarrow \sqrt{5} + \sqrt{2} - \sqrt{10} + 1$

89. (b) $3+\frac{1}{\sqrt{3}}+\frac{1}{3+\sqrt{3}}+\frac{1}{\sqrt{3}-3}$

$\rightarrow 3+\frac{1}{\sqrt{3}}+\frac{1}{3+\sqrt{3}}-\frac{1}{\sqrt{3}-3}$

$\rightarrow 3+\frac{1}{\sqrt{3}}+\left[\frac{3-\sqrt{3}-3-\sqrt{3}}{9-3}\right]$

$\rightarrow 3+\frac{1}{\sqrt{3}}-\frac{\sqrt{3}}{3}$

$\rightarrow 3+\frac{1}{\sqrt{3}}-\frac{1}{\sqrt{3}} \quad = 3$

90. (c) $\sqrt{8-2\sqrt{15}}$

$\rightarrow \sqrt{(\sqrt{5})^2-(\sqrt{3})^2-2\sqrt{5}\sqrt{3}}$

$\rightarrow \sqrt{(\sqrt{5}-\sqrt{3})^2} = [\sqrt{5}-\sqrt{3}] Ans.$

91. (d) $\left[8-\left(\frac{4^{\frac{9}{4}}\sqrt{2\times2^2}}{2\sqrt{2^2}}\right)\right]$

$\rightarrow \left[8-\left(\frac{2^{2\times\frac{9}{4}}\sqrt{2^{2+1}}}{2\sqrt{\frac{1}{4}}}\right)\right]$

$\rightarrow \left[8-\left(\frac{2^{\frac{9}{2}}.2^{\frac{3}{2}}}{2\times\frac{1}{2}}\right)\right]$

$\rightarrow \left[8-\left(\frac{2^{12/2}}{2\times\frac{1}{2}}\right)^{\frac{1}{2}}\right]$

$\rightarrow \left[8-\left(2^{\frac{12}{2}}\right)^{\frac{1}{2}}\right]$

$\rightarrow \left[8-\left(2^{6\times\frac{1}{2}}\right)\right]$

$\rightarrow$ [8 - 8] = 0 Ans.

92. (c) $\frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}}-\frac{2\sqrt{6}}{\sqrt{3}+1}+\frac{2\sqrt{3}}{\sqrt{6}+2}$

$\left[\frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}}\times\frac{\sqrt{6}-\sqrt{3}}{\sqrt{6}-\sqrt{3}}\right]$ - $\left[\frac{2\sqrt{6}}{\sqrt{3}+1}\times\frac{\sqrt{3}-1}{\sqrt{3}-1}\right]$ + $\left[\frac{2\sqrt{3}}{\sqrt{6}+2}\times\frac{\sqrt{6}-2}{\sqrt{6}-2}\right]$

$\rightarrow \frac{3\sqrt{2(\sqrt{6}-\sqrt{3})}}{3}-\left(\frac{2\sqrt{6}(\sqrt{3}-1)}{2}\right)+\frac{2\sqrt{3}\times\sqrt{6}-2}{2}$

$\rightarrow \sqrt{12} - \sqrt{6} - \sqrt{18} + \sqrt{6} + \sqrt{18} - 2\sqrt{3}$

$\rightarrow \sqrt{12} - 2\sqrt{3} \quad \rightarrow 2\sqrt{3} - 2\sqrt{3} = 0$

93. (b)

$$\left[\frac{1}{1.4}+\frac{1}{4.7}+\frac{1}{7.10}+\frac{1}{10.13}+\frac{1}{10.13}+\frac{1}{13.16}\right]$$

Formula:

$$\frac{1}{Differnece\ of\ denominator\ value}\left[\frac{1}{First\ V}-\frac{1}{Last\ Value}\right]$$

$\rightarrow \frac{1}{3}\left[1-\frac{1}{4}+\frac{1}{4}-\frac{1}{7}+\frac{1}{7}-\frac{1}{10}+\frac{1}{10}-\frac{1}{13}+\frac{1}{13}-\frac{1}{16}\right]$

$\rightarrow \frac{1}{3}\left[1-\frac{1}{16}\right] \rightarrow \frac{1}{3}\times\frac{15}{16}=\frac{5}{16}$

94. (c) a = 137, b = 133

$\rightarrow \frac{a\times a+b\times b+ab}{a\times a\times a-b\times b\times b}$

$\frac{(a^2+b^2+ab)}{a^3+b^3}$

$\rightarrow \frac{(a^2+b^2+ab)}{(a-b)(a^2+b^2+ab)}$

$\rightarrow \frac{1}{a-b}$

$\rightarrow \frac{1}{137-133} \rightarrow \frac{1}{4}$ Ans.

95. (b) a = 2.75, b = 2.25

$\frac{a^3-b^3}{(a^2+ab+b^2)}$

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

$\rightarrow$ (a - b) $\rightarrow$ 2.75 – 2.25

$\rightarrow$ 0.50

96. (b)

$\sqrt{7} - \sqrt{5} \rightarrow (\sqrt{7} - \sqrt{5})\frac{\sqrt{7}+\sqrt{5}}{(\sqrt{7}+\sqrt{5})} \rightarrow \frac{2}{\sqrt{7}+\sqrt{5}}$

$\rightarrow \sqrt{5}-\sqrt{3} \rightarrow \left[\frac{2}{\sqrt{5}+\sqrt{3}}\right]$ Largest

$\rightarrow \sqrt{9} - \sqrt{7} \rightarrow \frac{2}{\sqrt{9}+\sqrt{7}}$

$\rightarrow \sqrt{11} - \sqrt{9} \rightarrow \frac{2}{\sqrt{11}+\sqrt{9}}$

[$\sqrt{5}$ - $\sqrt{3}$]

97. (a)

$3\sqrt{9}$	$\sqrt{3}$	$4\sqrt{16}$	$6\sqrt{80}$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$9^{1/3}$	$3^{1/2}$	$16^{1/4}$	$80^{1/6}$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$9^{4/12}$	$3^{6/12}$	$16^{3/12}$	$80^{2/12}$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$\sqrt[12]{9^4}$	$\sqrt[12]{27^2}$	$\sqrt[12]{16^3}$	$\sqrt[12]{80^2}$

Square of 81 is largest. So Ans. $\sqrt[3]{9}$

98. (c)

$2\sqrt{3}$ $\quad 2\sqrt[4]{5}$ $\quad \sqrt{8}$ $\quad 3\sqrt{2}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$(4\times3)^{1/2} \quad \sqrt[4]{(5\times16)} \quad \sqrt{8} \quad \sqrt{18}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$12^{1/2} \quad 80^{1/4} \quad 8^{1/2} \quad 18/^{1/2}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$12^{2/4} \quad 80^{1/4} \quad 8^{2/4} \quad 18/^{2/4}$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$\sqrt[4]{144} \quad \sqrt[4]{80} \quad [\sqrt[4]{64}] \quad \sqrt[4]{324}$

smallest

$\sqrt{8}$ is answer

99. (d) $\frac{3+\sqrt{6}}{5\sqrt{3}-2\sqrt{12}-\sqrt{32}+\sqrt{50}}$

$\rightarrow \frac{3+\sqrt{6}}{5\sqrt{3}-2\times2\sqrt{3}-4\sqrt{2}+5\sqrt{2}}$

$\rightarrow \frac{3+\sqrt{6}}{5\sqrt{3}-4\sqrt{3}-4\sqrt{2}+5\sqrt{2}}$

$\rightarrow \frac{3+\sqrt{6}}{\sqrt{3}+\sqrt{2}} \rightarrow \frac{\sqrt{3(\sqrt{3}+\sqrt{2})}}{\sqrt{3}+\sqrt{2}}$

$\rightarrow \sqrt{3} = 1.732$

100. (c) $\frac{1}{\sqrt{5}+\sqrt{3}}\times\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}} = \frac{\sqrt{5}-\sqrt{3}}{5-3} \rightarrow \frac{2.236-1.732}{2}$

$\rightarrow \frac{0.504}{2} = 0.252$

101. (c) $2\sqrt[3]{32} - 3\sqrt[3]{4} + \sqrt[3]{500}$

$= 2\sqrt[3]{(2^3\times4)} - 3\sqrt[3]{4} + \sqrt[3]{(5^3\times4)}$

$= 2\times2\sqrt[3]{4} - 3\sqrt[3]{4} + 5\sqrt[3]{4}$

$= 9\sqrt[3]{4} - 3\sqrt[3]{4}$

$= 6\sqrt[3]{4}$

102. (b) $\sqrt{12+\sqrt{12}+\sqrt{12}+\ldots.}$

$[4] \times 3$

103. (a) $a = \frac{\sqrt{3}}{2} \rightarrow a+1 = \frac{\sqrt{3}}{2}+1$

$\rightarrow \frac{\sqrt{3}+2}{2}$

$\rightarrow \frac{4+2\sqrt{3}}{4} \rightarrow \frac{(\sqrt{3}+1)^2}{4}$

$a+1 = \frac{(\sqrt{3}+1)^2}{4}$

$\rightarrow \sqrt{a+1} = \sqrt{\frac{\sqrt{3}+1^2}{4}}$

$\rightarrow \sqrt{(a+1)} = \frac{\sqrt{3}+1}{2}$

Similarly, $\sqrt{1-a} = \frac{\sqrt{3}-1}{2}$

Put value :

$\frac{\sqrt{3}+1}{2}+\frac{\sqrt{3}-1}{2} \rightarrow \frac{\sqrt{3}+1\sqrt{3}-1}{2} = \frac{2\sqrt{3}}{2}$

$\rightarrow \sqrt{3}$

104. (b) $a+b = \frac{\sqrt{5}+1}{\sqrt{5}-1}+\frac{\sqrt{5}-1}{\sqrt{5}+1}$

$\rightarrow \frac{\left[(\sqrt{5}+1)^2+(\sqrt{5}-1)^2\right]}{(\sqrt{5}-1)(\sqrt{5}+1)}$

$\rightarrow \frac{2\left[(\sqrt{5})^2+1\right]}{5-1} = \frac{2(5+1)}{4} = 3$

$a.b = \frac{\sqrt{5}+1}{\sqrt{5}-1}\times\frac{\sqrt{5}-1}{\sqrt{5}+1} = 1$

Put value in expression

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

$= \frac{3^2-1}{3^2-3} = \frac{9-1}{9-3} = \frac{4}{3}$

105. (b) $(0.04)^{-1.5}$

$\rightarrow \frac{1}{(0.04)^{\frac{15}{10}}} = \frac{1}{0.04^{\frac{3}{2}}}$

$\rightarrow \frac{1}{\sqrt{0.000064}} \rightarrow \frac{1}{0.008} \rightarrow \frac{1000}{8}$

$\rightarrow 125$

106.

(a) $\sqrt[3]{1372} \times \sqrt[3]{1458} \times \sqrt[3]{343}$

$\rightarrow \frac{\sqrt[3]{(1372\times1458)}}{373} \rightarrow \sqrt[3]{5832}$

$\rightarrow \sqrt[3]{18\times18\times18} \rightarrow 18$

107. (d)

$\left[\frac{2}{\sqrt{5+\sqrt{3}}}-\frac{3}{\sqrt{6}-\sqrt{3}}+\frac{1}{\sqrt{6}+\sqrt{5}}\right]$

$\rightarrow \frac{2}{\sqrt{5}+\sqrt{3}}\times\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}} - \frac{3}{\sqrt{6}-\sqrt{3}}\times\frac{\sqrt{6}+\sqrt{3}}{\sqrt{6}+\sqrt{3}}$

$+ \frac{1}{\sqrt{6}-\sqrt{3}}\times\frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}-\sqrt{5}}$

$\rightarrow \frac{2(\sqrt{5}-\sqrt{3})}{5-3} - \frac{3(\sqrt{6}+\sqrt{3})}{6-3} + \frac{\sqrt{6}-\sqrt{5}}{6-5}$

$\rightarrow \sqrt{5} - \sqrt{3} - \sqrt{6} - \sqrt{3} + \sqrt{6} - \sqrt{5}$

$\rightarrow -2\sqrt{3}$

108. (b) $\left[\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}-\frac{\sqrt{3}-\sqrt{2}}{3+\sqrt{2}}\right]$

$\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}-\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} - \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}-\frac{\sqrt{3}+\sqrt{2}}{3-\sqrt{2}}$

$\rightarrow \frac{(\sqrt{3}+\sqrt{2})^2}{3-2} - \frac{(\sqrt{3}-\sqrt{2})^2}{3-2}$
→ (3 + 2 + 2√6) – (3 + 2 – 2√6)
→ 4√6

109. (a) $\frac{1}{\sqrt{9}-\sqrt{8}} \times \frac{\sqrt{9}+\sqrt{8}}{\sqrt{9}+\sqrt{8}} = \frac{\sqrt{9}+\sqrt{8}}{9-8}$
→ √9 + √8
Similarly, $\frac{1}{\sqrt{8}-\sqrt{7}} = \sqrt{8} + \sqrt{7}$
$\frac{1}{\sqrt{7}-\sqrt{6}} = \sqrt{7} + \sqrt{6}$
$\frac{1}{\sqrt{6}-\sqrt{5}} = \sqrt{6} + \sqrt{5}$
$\frac{1}{\sqrt{5}-\sqrt{4}} = \sqrt{5} + \sqrt{4}$
Now put in the question,
→ (√9 + √8) - (√8 + √7) + (√7 + √6) – (√6 + √5) + (√5 + √4)
→ √9 + √8 - √8 - √7 + √7 + √6 - √6 - √5 + √5 + √4
→ √9 + √4
→ 3 + 2 = 5

110. (c) $(\sqrt{2} + \sqrt{7 - 2\sqrt{10}})$
→ $\sqrt{2} + \sqrt{5^2 + \sqrt{2}^2 - 2\sqrt{5}\sqrt{2}}$
→ $\sqrt{2} + \sqrt{(\sqrt{5} - \sqrt{2})^2}$
→ √2 + √5 - √2
→ √5

111. (c) (√12 + √18) - (2√3 + 2√2)
→ 2√3 + 3√2 – 2√3 – 2√2
→ √2

112. (a) a = 5.624, b = 4.376
→ $\frac{a^3 + b^3}{a^2 - ab + b^2} = \frac{(a+b)(a^2+b^2-ab)}{(a^2 - ab + b^2)}$
→ (a + b)
→ 5.624 + 4.376
→ 10

113. (d) $\frac{(998)^2 - 997^2 - 45}{(98)^2 - (97)^2}$
→ $\frac{(998)^2 - 997^2 - 45}{(98)^2 - (97)^2}$
→ $\frac{(1995) - 45}{195}$ → $\frac{1950}{195}$ = 10

114. (b) $\frac{3\sqrt{5}}{2\sqrt{5} - 0.48}$
→ $\frac{3 \times 2.24}{2 \times 2.24 - 0.48}$ (√5 = 2.24)
→ $\frac{6.72}{4.48 - 0.48}$ → $\frac{6.72}{4}$
→ 1.68

115. (a) $\frac{1}{\sqrt{2}+1}$
→ $\frac{1}{\sqrt{2}+1} \times \frac{\sqrt{2}-1}{\sqrt{2}-1}$
→ $\frac{1}{\sqrt{2}+1} \times \frac{\sqrt{2}-1}{\sqrt{2}-1}$
→ $\frac{\sqrt{2}-1}{2-1}$ = (√2 - 1)
→ 1.414 – 1
→ 0.414

116. (b) √3 = 1.732
→ $\frac{2+\sqrt{3}}{2-\sqrt{3}} + \frac{2+\sqrt{3}}{2+\sqrt{3}} \rightarrow \frac{2+\sqrt{3}}{4-3}$
→ 4 + 3 + 4√3
→ 7 + 4 × 1.732
→ 7+ 6.928 → 13.928

117. (c) Shortcut method
$x + \frac{1}{x} = -2$
Let x = - 1
→ $-1 + \frac{1}{-1} = -2$ [matched, so x = - 1]
Put n = 1
$x^{2n+1} + \frac{1}{x^{2n+1}}$
→ $x^3 + \frac{1}{x^3}$ → $(-1)^3 + \frac{1}{(-1)^3} = -2$

118. (d) $m^n = 121 = 11^2$
→ m = 11 → n = 2
→ $(m - 1)^{n+1}$
→ $(11 - 1)^{2+1}$ → 10^3 → 1000

119. (a) $\frac{1}{3-\sqrt{8}}$
→ $\frac{1}{3-\sqrt{8}} \times \frac{3+\sqrt{8}}{3+\sqrt{8}}$
→ $\frac{3 + \sqrt{8}}{9-8}$
→ 3 + √8
Similarly ,
→ $\frac{1}{\sqrt{8}-\sqrt{7}} = \sqrt{8} + \sqrt{7}$
$\frac{1}{\sqrt{7}-\sqrt{6}} \rightarrow \sqrt{7} + \sqrt{6}$
→ $\frac{1}{\sqrt{6}-\sqrt{5}} = \sqrt{6} + \sqrt{5}$
→ $\frac{1}{\sqrt{5}-2} = \sqrt{5} + 2$
Put value in question,
→ $(3 + \sqrt{8}) - (\sqrt{8} + \sqrt{7}) + (\sqrt{7} + \sqrt{6})$
- (√6 + √5) + (√5 + 2)
→ 3 + √8 - √8 - √7 + √7 + √6 - √6 - √5 + √5 + 2
→ 3 + 2 = 5

120. (d) $256^{0.16} \times 4^{0.36}$

$\rightarrow 4^{4\times0.16} \times 4^{0.36}$

$\rightarrow 4^{0.64+0.36} \rightarrow 4^1 = 4$

121. (a) Let 0.337 = x and 0.126 = y

Now, expression is

$\frac{(a+b)^2-(a-b)^2}{ab} = \frac{4ab}{ab} = 4$

122. (a) $16\sqrt{\frac{3\times4}{4\times4}} - 9\sqrt{\frac{4\times3}{3\times3}}$

$\rightarrow 16\times\frac{\sqrt{12}}{4} - \frac{9\sqrt{12}}{3}$

$\rightarrow 4\sqrt{12} - 3\sqrt{12}$

$\rightarrow \sqrt{12} \rightarrow 3.46$

123. (c) $3^{x+y} = 81$

$3^{x+y} = 3^4$

$\rightarrow x + y = 4$ ..... (i)

$81^{x-y} = 3$

$3^{4x-4y} = 3$

$\rightarrow 4x - 4y = 1$ ..... (ii)

From equation (i) and (ii)

$4x - 4y = 1$

$4x + 4y = 16$

$8x = 17$

$x = \frac{17}{8}$

124. (a) $\frac{3\sqrt{2}+2\sqrt{3}}{3\sqrt{2}-2\sqrt{3}}$

$\rightarrow \frac{3\sqrt{2}+2\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} \times \frac{3\sqrt{2}+2\sqrt{3}}{3\sqrt{2}+2\sqrt{3}}$

$\rightarrow \frac{(3\sqrt{2}+2\sqrt{3})^2}{18-12}$

$\rightarrow \frac{18+12+2+\times3\times2\sqrt{3}.\sqrt{2}}{6}$

$\rightarrow \frac{30+12\sqrt{6}}{6}$

$\rightarrow \frac{30+12\sqrt{6}}{6} \rightarrow 5+2\sqrt{6}$

125. (d) $\left[\left(5\sqrt{x^{-\frac{3}{5}}}\right)^{-\frac{5}{3}}\right]^{-5}$

$= \left[\left(x^{-\frac{3}{25}}\right)^{-\frac{5}{3}}\right]^{-5} = \left[\left(x^{\frac{1}{5}}\right)\right]^{-5}$

$= x^{\frac{1}{5}\times5} = x^{-1} = 1/x$

126. (a) $\frac{\sqrt{3}+1}{\sqrt{3}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}-1} + \frac{\sqrt{3}-1}{\sqrt{3}+1} + \frac{\sqrt{2}-1}{\sqrt{2}+1}$

$\rightarrow \frac{\sqrt{3}+1}{(\sqrt{3}-1)} \times \frac{\sqrt{3}+1}{(\sqrt{3}+1)} + \frac{\sqrt{2}+1}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1}$

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

$= \frac{(\sqrt{3}+1)^2}{3-1} + \frac{(\sqrt{2}+1)^2}{2-1} + \frac{(\sqrt{3}-1)^2}{3-1}$

$\frac{(\sqrt{2}-1)^2}{2-1}$

127. $\rightarrow$(d) $\sqrt[4]{(3x+1)} = 2$

$(4\sqrt{(3x+1)^4} = 2^4$

$(3x + 1)4 \times \frac{1}{4} = 16$

$3x = 15, \ x = 5$

128. (a) $\frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}+\sqrt{5}} + \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}}$

$\rightarrow \frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}+\sqrt{5}} + \frac{(\sqrt{7}-\sqrt{5})}{\sqrt{7}-\sqrt{5}} + \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}+\sqrt{5}} + \frac{(\sqrt{7}-\sqrt{5})}{\sqrt{7}-\sqrt{5}}$

$\rightarrow \frac{(\sqrt{7}-\sqrt{5})^2}{2} + \frac{(\sqrt{7}+\sqrt{5})^2}{2}$

$\rightarrow \frac{7+5-2\sqrt{3}+7+5+2\sqrt{35}}{2}$

$\rightarrow 24/2 = 2$

129. (d) $\frac{2}{\sqrt{6}-2} + \frac{1}{\sqrt{7}+\sqrt{6}} + \frac{1}{\sqrt{8}-\sqrt{7}} + 2 - 2\sqrt{2}$

$\rightarrow \frac{2}{\sqrt{6}+2} \times \frac{\sqrt{6}-2}{\sqrt{6}-2} + \frac{1}{\sqrt{7}+\sqrt{6}} \times \frac{\sqrt{7}-\sqrt{6}}{\sqrt{7}-\sqrt{6}} + \frac{1}{\sqrt{8}-\sqrt{7}} \times \frac{\sqrt{8}+\sqrt{7}}{\sqrt{8}+\sqrt{7}} + 2 - 2\sqrt{2}$

$\rightarrow \frac{2(\sqrt{6}-2)}{6-4} + \frac{\sqrt{7}-\sqrt{6}}{7-6} + \frac{\sqrt{8}+\sqrt{7}}{8-7} + 2 - 2\sqrt{2}$

$\rightarrow \sqrt{6} - 2 + \sqrt{7} - \sqrt{6} + \sqrt{8} + \sqrt{7} + 2 - 2\sqrt{2}$

$\rightarrow \sqrt{6} - 2 + \sqrt{7} - \sqrt{6} + 2\sqrt{2} + \sqrt{7} + 2 - 2\sqrt{2}$

$\rightarrow 2\sqrt{7}$

130. (a) $\left[\left\{\left(-\frac{1}{2}^2\right)\right\}^{-2}\right]^{-1}$

$\rightarrow \left\{\left(-\frac{1}{2}^2\right)\right\}^{-2\times-1}$

$\rightarrow \left(-\frac{1}{2}\right)^{2\times2} \rightarrow \left(-\frac{1}{2}\right)^4 \rightarrow \frac{1}{16}$

131. (b) $\frac{256\times256\times144\times144}{112}$

$\rightarrow \frac{(256)^2-(144)^2}{112}$

$\rightarrow \frac{(112)(400)}{112} \rightarrow 400$

132. (d) a = 8.7, b = 1.3
→ a ×a + 2 × a × b + b × b
$a^2 + 2ab + b^2$
→ $(a + b)^2$
$(8.7 + 1.3)^2$
→ $(10)^2$ × 100

133. (a) a = 3.06, b = 1.98
→ $\frac{a^3 - b^3}{a^2 + a \times b + b^2}$
→ $\frac{a - b\,(a^2 + b^2 + ab)}{a^2 + ab + b^2}$
→ (a − b)
→ 3.06 - 1.98 = 1.08

134. (c) a = 3.25, b = 1.75
→ $\frac{a \times a + b \times b - 2 \times a \times b}{a \times a - b \times b}$
→ $\frac{a^2 + b^2 - 2ab}{a^2 - b^2}$
→ $\frac{(a-b)^2}{(a-b)(a+b)} = \frac{a-b}{a+b}$
→ $\frac{3.25 - 1.75}{3.25 + 1.75}$
→ $\frac{1.50}{5}$ → $\frac{3}{10}$ = 0.3

135. (b) a = 0.08, b = 0.02
→ $\frac{a \times a \times a + b \times b \times b}{a \times a - ab + b \times b}$
→ $\frac{a^3 + 3}{a^2 - ab + b^2}$
$\frac{a + b\,(a^2 - ab + b^2)}{a^2 - ab + b^2}$
→ a + b
→ 0.08 + 0.02 → 0.10

136. (b) 2^{60} → $(2^5)^{12}$ → $(32)^{12}$
→ 3^{48} → $(3^4)^{12}$ → $(81)^{12}$
→ 4^{36} → $(4^3)^{12}$ → $(64)^{12}$
→ 5^{24} → $(5^2)^{12}$ → $(25)^{12}$ → 3^{48}

137. √2 3√3 4√5 6√6
↓ ↓ ↓ ↓
$2^{1/2}$ $3^{1/3}$ $5^{1/4}$ $6^{1/6}$
↓ ↓ ↓ ↓
$2^{6/12}$ $3^{4/12}$ $5^{3/12}$ $6^{2/12}$
↓ ↓ ↓ ↓
$\sqrt[12]{2^6}$ $\sqrt[12]{3^4}$ $\sqrt[12]{5^3}$ $\sqrt[12]{6^2}$
↓ ↓ ↓ ↓
$\sqrt[12]{64}$ $\sqrt[12]{81}$ $\sqrt[12]{125}$ $\sqrt[12]{36}$
↓
Greatest
→ 4√5

138. (d) 0.9 $(0.9)^2$ √0.9 0.9
↓ ↓ ↓
.81 0.95 $\frac{9}{9}$
↓ ↓ ↓
0.9 .91 0.95 1
↓
(Largest)
→ 0.9

139. (b) Shortcut method.
$\sqrt{\sqrt{12} + \sqrt{12 + 12}}$ ....
[4] × 3
Thus, Take closest factor and largest is answer.

140. (b) $\sqrt{12 + \sqrt{12 + 12}}$ ....
Shortcut method.
→ When the question in from
→ $\sqrt{n\sqrt{n\sqrt{n}}}$ ... ...
→ So n is answer,
→3

141. (c) Shorcut methodl
Take out option and try
Let number is √6
→ 6(√3 + √2) = √12 + √18
→ √18 + √12 = √12 + √18
Matched
So this is answer.

142. (a) $\frac{2+\sqrt{3}}{2-\sqrt{3}} + \frac{2-\sqrt{3}}{2+\sqrt{3}} + \frac{\sqrt{3}+1}{\sqrt{3}-1}$
→ $\left(\frac{2+\sqrt{3}}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}}\right) + \left(\frac{2-\sqrt{3}}{2+\sqrt{3}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}}\right)$
$+ \left(\frac{\sqrt{3}+1}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1}\right)$
→ $\frac{(2+\sqrt{3})^2}{4-3} + \frac{(2-\sqrt{3})^2}{4-3} + \frac{(\sqrt{3}+1)^2}{3-1}$
→ $4 + 3 + 4\sqrt{3} + 4 + 3 - 4\sqrt{3} + \frac{3 + 1 + 2\sqrt{3}}{2}$
→ 7 + 7 + 2 + √3 → 16 + √3

143. (b) $\sqrt{14 + 6\sqrt{5}}$
→ $\sqrt{(3)^2 + (\sqrt{5})^2 + \times 2 \times 3 \times \sqrt{5}}$
→ $\sqrt{(3 + \sqrt{5})^2}$ → $3 + \sqrt{5}$

144. (b) $\frac{1}{\sqrt{2}+1} = \frac{1}{\sqrt{2}+1} \times \frac{\sqrt{2}-1}{\sqrt{2}-1}$
= $\frac{\sqrt{2}-1}{2-1}$ = √2 − 1
Similarly,
→ $\frac{1}{\sqrt{3}+\sqrt{2}} = \sqrt{3} - \sqrt{2}$ and so on.
Now put value

→ √2 – 1 + √3 - √2 + √4 - √3 ..... + √100 - √99

→ √100 – 1 → 10 – 1 = 9

145. (b) Let P = 0.05

Then, $\frac{P}{10} = 0.05$

Let 0.41 = q

Thus, 0.041 = $\frac{q}{10}$

And 0.073 = r

Thus, 0.073 = $\frac{r}{10}$

According to the question,

$$\frac{p^2 + q^2 + r^2}{\left(\frac{p}{10}\right)^2 + \left(\frac{q}{10}\right)^2 + \left(\frac{r}{10}\right)^2}$$

$$\frac{p^2+q^2+r^2}{\frac{1}{100}(p^2+q^2+r^2)} \rightarrow 100$$

146. (c) 6√12 3√3 4√4

↓ ↓ ↓

$(12)^{1/6}$ $3^{1/3}$ $4^{1/4}$

↓ ↓ ↓

$12^{2/12}$ $3^{4/12}$ $4^{3/12}$

↓ ↓ ↓

$^{12}\sqrt{144}$ $^{12}\sqrt{81}$ $^{12}\sqrt{64}$

↓

Smallest

147. (b) √2 3√9 4√16 5√32

↓ ↓ ↓ ↓

1.41 3√9 2 2

$^3\sqrt{9} > 2O(2 \times 2 \times 2 = 8$, so $3\sqrt{9} > 2)$

$3\sqrt{9}$ (greatest one)

148. (b) $^4\sqrt{3}$ $^5\sqrt{4}$ $^{10}\sqrt{12}$ 1

↓ ↓ ↓ ↓

$3^{1/4}$ $4^{1/5}$ $12^{1/10}$ 1

↓ ↓ ↓ ↓

$3^{5/20}$ $4^{4/20}$ $12^{2/20}$ 1

↓ ↓ ↓ ↓

$^{20}\sqrt{243}$ $^{20}\sqrt{256}$ $^{20}\sqrt{144}$ 1

149. (c) 3√2 3√7 6√5 2√20

↓ ↓ ↓ ↓

√(9×2) √(9×7) √(36×5) √(4×20)

↓ ↓ ↓ ↓

√18 √63 √180 √80

150. (d) √0.09 $^3\sqrt{0.064}$ 0.55 3/5

↓ ↓ ↓ ↓

0.3 0.4 0.5 0.6

151. (b) 0.16 √0.16 $(0.16)^2$ 0.04

↓ ↓ ↓ ↓

0.16 0.40 0.0256 0.04

152. (d) $^2\sqrt{8}$ $^4\sqrt{13}$ $^5\sqrt{16}$ $^{10}\sqrt{41}$

↓ ↓ ↓ ↓

$8^{1/2}$ $13^{1/4}$ $16^{1/5}$ $41^{1/10}$

$8^{10/20}$ $13^{5/20}$ $16^{4/20}$ $41^{2/20}$

↓ ↓ ↓ ↓

$^{20}\sqrt{8^{10}}$ $^{20}\sqrt{13^5}$ $^{20}\sqrt{16^4}$ $^{20}\sqrt{41^2}$

↓ ↓ ↓ ↓

$^{20}\sqrt{64^5}$ $^{20}\sqrt{13^5}$ $^{20}\sqrt{16^0}$ $^{20}\sqrt{41^2}$

153. (b) $2\sqrt{2} + \sqrt{2} + \frac{1}{2+\sqrt{2}} - \frac{1}{2-\sqrt{2}}$

→ $2\sqrt{2} + \sqrt{2} + \left(\frac{2-\sqrt{2}-2-\sqrt{2}}{(2+\sqrt{2})(2-\sqrt{2})}\right)$

→ $2\sqrt{2} + \sqrt{2} + \frac{-2\sqrt{2}}{4+2}$

→ $2\sqrt{2} + \sqrt{2} - \frac{2\sqrt{2}}{2}$

→ $2\sqrt{2} + \sqrt{2} - \sqrt{2}$

→ $2\sqrt{2}$

→ 2 × 1.4142

= 2.8284

154. (a) $\sqrt{\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}}$

→ $\sqrt{\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}} = \sqrt{\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}}$

→ $\frac{(\sqrt{3}+\sqrt{2})^2}{3-2}$ → √3 + √2

155. (c) $0.42 \times 100^k = 42$

→put k = 1

→ $0.42 \times 100^1 = 42$

→42 = 42 matched

So k = 1

156. (a) $2^x = 3^y = 6^{-z} = k$

→ $2 = k^{1/x}$, $3 = k^{1/y}$, $6 = k^{-1/z}$

Thus, 2 × 3 = 6

$k^{1/x} \times 5^{1/y} = 5^{-1/z}$

$$\frac{1}{x} + \frac{1}{y} = -\frac{1}{z} \rightarrow \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$$

157. (c) $\frac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}} + \frac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}$

$$\frac{(1+\sqrt{2})(\sqrt{5}-\sqrt{3})(1-\sqrt{2})(\sqrt{5}-\sqrt{3})}{(\sqrt{5}+\sqrt{3})(\sqrt{5}-\sqrt{3})}$$

→ $\frac{\sqrt{5}-\sqrt{3}+\sqrt{10}-\sqrt{6}+\sqrt{5}+\sqrt{3}-\sqrt{10}-\sqrt{6}}{5-3}$

→ $\frac{2\sqrt{5}-2\sqrt{6}}{2}$ → $\frac{2(\sqrt{5}-\sqrt{6})}{2}$

→ √5 - √6

158. (d) $256^{-\left[4^{-\frac{3}{2}}\right]} \rightarrow 256^{-\left[1\frac{3}{4}^{\frac{3}{2}}\right]}$

$\rightarrow 256^{-\left[\frac{1}{8}\right]}$

$\rightarrow \frac{1}{256^{\frac{1}{8}}}$

$\rightarrow \frac{1}{256^{8\times\frac{1}{8}}} \rightarrow 1/2$

159. (b)

$2^3\sqrt{40} \rightarrow 2\times\sqrt[3]{2\times2\times2\times5}$

$2\times2\sqrt[3]{5}$

$\rightarrow 4\sqrt[3]{5}$

$\rightarrow 4\sqrt[3]{320}$

$4\times3\sqrt{4\times4\times4\times5}$

$\rightarrow 4\times4\sqrt[3]{5}$

$\rightarrow 16\sqrt[3]{5}$

$\rightarrow 3\sqrt[3]{625}$

$3\times\sqrt[3]{5\times5\times5\times5}$

$\rightarrow 3\times5\sqrt[3]{5}$

$\rightarrow 15\sqrt[3]{5}$

160. (b) $\sqrt[3]{0.000125}$

$\rightarrow 3\sqrt{0.05\times0.05\times0.05} \rightarrow 0.05$

161. (c) $\frac{0.355\times0.5555\times2.025}{0.225\times1.775\times0.2222}$

$\rightarrow \frac{355\times5555\times2025}{225\times1775\times2222}$

$\rightarrow \frac{1\times5\times81}{9\times5\times2}$

$\rightarrow 4.5$

162. (c) $\sqrt{40+\sqrt{9\sqrt{81}}}$

$\rightarrow \sqrt{40+\sqrt{9\times9}}$

$\rightarrow \sqrt{40+9} \rightarrow \sqrt{49} \rightarrow 7$

163. (b) $\frac{x-\sqrt{24}\ (\sqrt{75}+\sqrt{50})}{\sqrt{75}-\sqrt{50}} = 1$

$\rightarrow$ (x - √24) $= \frac{\sqrt{75}-\sqrt{50}}{75-50}$

$\rightarrow$ (x - √24) $= \frac{(\sqrt{75}-\sqrt{50})^2}{75-50}$

$\rightarrow$ (x - √24) $= \frac{75+50-2\sqrt{75}\sqrt{50}}{25}$

$\rightarrow$ (x - √24) $= \frac{125-50\sqrt{6}}{25}$

$\rightarrow$ (x - √24) $= \frac{25(5-2\sqrt{6})}{25}$

$\rightarrow$ x – 2√6 = 5- 2√6

$\rightarrow$ x = 5

164. (c)

$\sqrt{20}+\sqrt{12}+\sqrt[3]{729} - \frac{4}{(\sqrt{5}-\sqrt{3})} - \sqrt{81}$

$\rightarrow 2\sqrt{5}+2\sqrt{3}+9-\left(\frac{4}{\sqrt{5}-\sqrt{3}}\times\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}\right)-9$

$\rightarrow 2\sqrt{5}+2\sqrt{3}+9-\left(\frac{4(\sqrt{5}+\sqrt{3})}{2}\right)-9$

$\rightarrow 2\sqrt{5}+2\sqrt{3}+9-2\sqrt{5}-2\sqrt{3}-9$

$\rightarrow 0$

165. (a) $\frac{1}{2-\sqrt{3}}+\frac{1}{3-\sqrt{8}}+\frac{1}{4-\sqrt{15}}$

$\rightarrow \frac{1}{2-\sqrt{3}}\times\frac{2+\sqrt{3}}{2+\sqrt{3}}+\frac{1}{3-\sqrt{18}}\times\frac{3+\sqrt{8}}{3+\sqrt{8}}$

$+\frac{1}{4-\sqrt{15}}\times\frac{4+\sqrt{15}}{4+\sqrt{15}}$

$\rightarrow \frac{2+\sqrt{3}}{4-3}+\frac{3+\sqrt{8}}{9-8}+\frac{4+\sqrt{15}}{16-15}$

$\rightarrow 2+\sqrt{3}+3+\sqrt{8}+4+\sqrt{15}$

$\rightarrow 9+\sqrt{3}+2\sqrt{2}+\sqrt{15}$

a = 9 < 9 + √3 + 2 √2 + √15 < 18

√3 = 1.73, 2√2 = 1.41, √15 = 3.9

$\rightarrow 9 < 9+1.73+(2\times1.41)+3.9$

$\rightarrow 17.4 < 18$

166. (a)

a√2 + b√3 = √98 + √108 - √48 - √72

$\rightarrow \sqrt{7\times7\times2}+\sqrt{3\times3\times3\times2\times2}-\sqrt{2\times2\times2\times2\times3}-\sqrt{3\times3\times2\times2\times2}$

$\rightarrow$ 7 √2 + 6√3 - 4√3 – 6√2

a√2 + b√3 = 1√2 + 2√3

a = 1

b = 2

167. (a)

$\sqrt[3]{a} = \sqrt[3]{26} + \sqrt[3]{7} + \sqrt[3]{63}$

Take round figure

$\rightarrow \sqrt[3]{a} < \sqrt[3]{27} + \sqrt[3]{8} + \sqrt[3]{64}$

$\rightarrow 3\sqrt{a} < 3 + 2 + 4$

$3\sqrt{a} < 9$

→ $a < 9^3$

→ a = 729

Option A is answer.

168. (d) $\frac{\sqrt{72}\times\sqrt{363}\times\sqrt{175}}{\sqrt{32}\times\sqrt{147}\times\sqrt{252}}$

→ $\frac{\sqrt{2\times2\times2\times3\times3}\times\sqrt{11\times11\times3\times}}{\sqrt{2\times2\times2\times2\times2\times}\sqrt{3\times7\times7\times}}$ .....

→ $\frac{\sqrt{\sqrt{5}\times5\times7}}{\sqrt{2\times2\times3\times3\times7}}$

→ $\frac{6\sqrt{2\times11\sqrt{3}\times5\sqrt{7}}}{4\sqrt{2}\times7\sqrt{3\times6\sqrt{7}}}$

→ $\frac{6\times11\times5}{4\times7\times6} = \frac{55}{28}$

169. (d) $2+\frac{6}{\sqrt{3}}+\frac{1}{2+\sqrt{3}}+\frac{1}{\sqrt{3}-2}$

$2+\frac{2\times3\sqrt{3}}{\sqrt{3}\times\sqrt{3}}+\frac{1}{2+\sqrt{3}}-\frac{1}{2-\sqrt{3}}$

→ $2+2\sqrt{3}+\frac{(2-\sqrt{3})-(2+\sqrt{3})}{(2+\sqrt{3})(2-\sqrt{3})}$

→ $2+2\sqrt{3}+\frac{2-\sqrt{3}-2-\sqrt{3}}{4-3}$

→ 2 + 2√3 – 2√3

→ 2

170. (c) $\frac{4+3\sqrt{3}}{\sqrt{7+4\sqrt{3}}} = A+\sqrt{B}$

→ $\sqrt{7+4\sqrt{3}}$

→ (2 + √3)

→ $\frac{4+3\sqrt{3}}{2+\sqrt{3}} = A+\sqrt{B}$

$\frac{4+3\sqrt{3}}{2+\sqrt{3}}\times\frac{2-\sqrt{3}}{2-\sqrt{3}} = A+\sqrt{B}$

→ $\frac{(4+3\sqrt{3})(2-\sqrt{3})}{4-3} = A+\sqrt{B}$

→ 8 – 4√3 + 6√3 – 9 = A + √B

→ 2√3 – 1 = A + √B

A = - 1 and √B = 2√3

B = 2√3 × 2√3 = 12

B – A = 12 – (- 1) = 13

171. (b) 2√50 + √18 - √72

→ 2 × 5√2 + 3√2 – 6√2

→ 13√2 – 6√2

→ 7√2 4 7×1.414

→ 9.898

172. (b) 0.16 √0.16 $(0.16)^2$ 0.04

↓ ↓ ↓ ↓

0.16 0.40 0.0256 0.04

173. (c)

$\sqrt[3]{2}$ $\sqrt{3}$

↓ ↓

$2^{1/3}$ $3^{1/2}$

↓ ↓

$2^{2/5}$ $3^{3/6}$

↓ ↓

$\sqrt[6]{4} < \sqrt[6]{27}$

174. (c) $4^{10}\times7^3\times16^2\times11\times10^2$

→ $(2^2)^{10}\times(7)^3\times(2^4)^2\times11^1\times2^2\times5^2$

→ $2^{20+8+2}\times7^3\times11^1\times5^2$

→ $20^{30}\times7^3\times11^1\times5^2$

Total factors = 30 + 3 + 1 + 2 = 36

175. (a) $6^{333}\times7^{222}\times8^{111}$

→ $2^{333}\times3^{333}\times7^{222}\times(2^3)^{111}$

→ $2^{666}\times3^{333}\times7^{222}$

→ Total factors 266 + 333 + 222 = 1221

176. (c) $\sqrt{30+\sqrt{30+\sqrt{30}}}$

[6] × 5

177. (a) $x = \sqrt{2\sqrt[3]{4}\sqrt{2\sqrt[3]{4}}}$ ... ...

→ Squaring both sides

→ $x^2 = 2\sqrt[3]{4}\sqrt{2\sqrt[3]{4}}$ .....

Now cubing both sides

$x^6 = 8\times4x$

$\rightarrow x^5 = 2^5$

$\rightarrow x = 2$

178. (b) a = 55, b = 17

c = - 72

a + b + c = 55 + 17 – 72 = 0

Thus, $a^3 + b^3 + c^3 - 3abc = 0$

(a + b + c) = 0

answer = 0

179. (d) Let a = 2.75

b = 2.25

Now, $\rightarrow \frac{a^3 - b^3}{a^2 + ab + b^2}$

$\rightarrow \frac{(a-b)(a^2 + ab + b^2)}{(a^2 + ab + b^2)}$

→ 2.75 – 2.25

→ 0.50 $\rightarrow \frac{1}{2}$

180. (b) $\frac{243^{n/5} \times 3^{2n+1}}{9^n \times 3^{n-1}}$

$\rightarrow \frac{3^{5\times n/5} \times 3^{n+1}}{3^{2n} \times 3^{n-1}}$

$\rightarrow \frac{3^n \times 3^{2n+1}}{3^{2n} + 3^{n+1}}$

$\rightarrow \frac{3^{n+2n+1}}{3^{2n+n+1}}$

$\rightarrow \frac{3^{3n+1}}{3^{3n-1}}$

$\rightarrow 3^{(3n+1)-(3n-1)} \rightarrow 3^{3n+1-3n+1}$

$\rightarrow 3^2 = 9$

181. (c) (√3 + 1)(10 + √12) (√12 - 2)(5 - √3)

→ (√3 + 1)(10 + 2√3)(2√3 – 2) (5 - √3)

→ (√3 + 1)×2 (5 + √3) × 2(√3 - 1)(5 - √3)

→ 4(√3 + 1)(√3 - 1) (5 + √3)(5 - √3)

$\rightarrow 4\left[\left(\sqrt{3}\right)^2 - 1^2\right][5^2 - \sqrt{3}^2]$

→ 4 × 2 × 22 → 176

182. (b) $(0.2)^3 \times 200 \div 2000$ of $(0.2)^2$

$\rightarrow \frac{0.2\times0.2\times0.2\times200}{2000\times0.2\times0.2} \rightarrow \frac{0.2\times200}{2000}$

$\rightarrow \frac{40.0}{2000} \rightarrow \frac{1}{50}$

183. (d) $x^2 - \sqrt{3} = 0$

$x^2 - 3^{1/2} = 0$

$x^2 - (3^{1/4})^2 = 0$

$(x + 3^{1/4})(x - 3^{1/4}) = 0$

$x = 3^{1/4}$ or $- 3^{1/4}$

Product of roots

$3^{1/4} \times [-(3)^{1/4}] = -\sqrt{3}$

184. (d) $2^{n-1} + 2^{n+1} = 320$

$\rightarrow 2^{n-1}(1 + 2^2)320$

$\rightarrow 2^{n-1}(1 + 2^2) = 320$

$\rightarrow 2^{n-1} \times 5 = 320$

$\rightarrow 2^{n-1} = \frac{320}{5} = 64$

$\rightarrow (2)^{n-1} = \frac{320}{5} = 64$

$\rightarrow (2)^{n-1} = (2)^6$

→ n = 7

185. (a) $4^{61} + 4^{62} + 4^{63} + 4^{64}$

$4^{61}(4^0 + 4^1 + 4^2 + 4^3)$

$4^{61} \times 85$

Now check with option

17 is divisible by 85

186. (a) $5\sqrt{5} \times 5^3 \div 5^{-3/2} = 5^{a+2}$

$\rightarrow 5^1 \times 5^{1/2} \times 5^3 \div 5^{-3/2} = 5^{a+2}$

$\rightarrow 5^{1+1/2+3-(-3/2)} = 5^{a+2}$

$\rightarrow 5^6 = 5^{a+2}$

$\rightarrow a + 2 = 6$

$\rightarrow a = 4$

187. (b) AT the start t = 0°

$\rightarrow 2 - 1 = 1$ cm

188. (c) $\frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}}$

$+\frac{1}{\sqrt{5}-2} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{3-\sqrt{8}}$

Rationalising

$\rightarrow \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}(\sqrt{7}-\sqrt{6})} - \frac{1}{(\sqrt{6}-\sqrt{5})}$

$\times \frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}+\sqrt{5}} + \frac{\sqrt{5}+\sqrt{4}}{(\sqrt{5}-\sqrt{4})(\sqrt{5}+\sqrt{4})}$

$+ \frac{\sqrt{9}+\sqrt{8}}{(\sqrt{9}+\sqrt{8})(\sqrt{9}-\sqrt{8})}$

$\rightarrow \frac{\sqrt{7}+\sqrt{6}}{1} - \frac{(\sqrt{6}+\sqrt{5})}{1} + \frac{(\sqrt{6}+\sqrt{5})}{1} - \frac{\sqrt{8}+\sqrt{7}}{1} + \frac{\sqrt{9}+\sqrt{8}}{1}$

$\rightarrow$ √7 + √6 - √6- √5 + √5 + √4 - √8 - ….. √7 + √9 + √8

$\rightarrow$√4 + √9 = 2 + 3 = 5

189. (d)

$$\frac{\sqrt{10+\sqrt{25+\sqrt{108+\sqrt{154+\sqrt{225}}}}}}{\sqrt[3]{8}}$$

$$\rightarrow \frac{\sqrt{10+\sqrt{25+\sqrt{108+\sqrt{109}}}}}{2}$$

$$\rightarrow \frac{\sqrt{10+\sqrt{25+\sqrt{121}}}}{2} = \frac{\sqrt{10+\sqrt{36}}}{2}$$

$\rightarrow \frac{\sqrt{16}}{2} \rightarrow \frac{4}{2} \rightarrow 2$

190. (d) According to the question,

$\rightarrow \frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}}$

$\rightarrow \frac{1}{(\sqrt{2}-\sqrt{5})+\sqrt{3}} + \frac{1}{(\sqrt{2}-\sqrt{5})-\sqrt{3}}$

$\rightarrow \frac{\sqrt{2}-\sqrt{5}-\sqrt{3}+\sqrt{2}-\sqrt{5}+\sqrt{3}}{(\sqrt{2}-\sqrt{5})^2-(\sqrt{3})^2}$

$\rightarrow \frac{2(\sqrt{2}-\sqrt{5})}{7-2\sqrt{10}-3}$

$\rightarrow \frac{2(\sqrt{2}-\sqrt{5})}{4-2\sqrt{10}}$

$\rightarrow \frac{\sqrt{2}-\sqrt{5}}{2-\sqrt{10}}$

$\rightarrow \frac{1}{\sqrt{2}} \frac{(\sqrt{2}-\sqrt{5})}{\sqrt{2}-\sqrt{5}} \frac{1}{\sqrt{2}}$

191. (d) $\frac{(\sqrt{6}+2)}{\sqrt{2}+\sqrt{2}+\sqrt{3}} - \frac{\sqrt{6}-2}{\sqrt{2}-\sqrt{2}-\sqrt{3}} - \frac{2\sqrt{2}}{2+\sqrt{2}}$

$\rightarrow \frac{\sqrt{6}+2}{\sqrt{2}+\frac{\sqrt{3}+1}{2}} \frac{\sqrt{6}-2}{\sqrt{2}-\frac{\sqrt{3}-1}{\sqrt{2}}} - \frac{2}{\sqrt{2}+1}$

$\rightarrow \frac{(\sqrt{6}+2)\sqrt{2}}{2+\sqrt{3}+1} - \frac{(\sqrt{6}-2)\sqrt{2}}{2-\sqrt{3}+1} - \frac{2}{\sqrt{2}+1}$

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

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

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

√3×√2×$\frac{\sqrt{2}}{\sqrt{3}}$ + 2√3 × $\frac{\sqrt{2}}{\sqrt{2}}$ -2 (√2-1)

-2 +2√2 -2√2 +2 = 0

192. (a) $\frac{6^2+7^2+8^2+9^2+10^2}{\sqrt{7+4\sqrt{3}}-\sqrt{4+2\sqrt{3}}}$

$\rightarrow \frac{6^2+7^2+8^2+9^2+10^2}{\sqrt{(2+\sqrt{3})^2}-\sqrt{(\sqrt{3}+1)^2}}$

$\rightarrow \frac{6^2+7^2+8^2+9^2+10^2}{2+\sqrt{3}-\sqrt{3}-1}$

$\rightarrow 6^2 + 7^2 + 8^2 + 9^2 + 10^2$

$\rightarrow$ 36 + 49 + 64 + 81 + 100 $\rightarrow$ 330 Ans.

193. (d) $\frac{3x-2y}{2x+3y} = \frac{5}{6}$

$18x - 12y = 10x + 15y$

$8x = 27y$

$\frac{x}{y} = \frac{27}{8}$ $\left[\frac{\sqrt[3]{x}+\sqrt[3]{y}}{3\sqrt[3]{x}-3\sqrt[3]{y}}\right]^2$

$\left[\frac{\sqrt[3]{27}+\sqrt[3]{8}}{3\sqrt[3]{27}-3\sqrt[3]{8}}\right]^2$

$\rightarrow \left(\frac{3+2}{3-2}\right) = (5)^2 = 25$ Ans.

194. (a) $\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \frac{1}{\sqrt{5}+\sqrt{4}}$

$+\frac{1}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{7}+\sqrt{6}} + \frac{1}{\sqrt{8}+\sqrt{7}}$

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

After Rationalizing

$= (\sqrt{2} - 1) + (\sqrt{3} - \sqrt{2}) + (\sqrt{4} - \sqrt{3}) + (\sqrt{5} - \sqrt{4}) +$

$(\sqrt{6} - \sqrt{5}) + (\sqrt{7} - \sqrt{6}) + (\sqrt{8} - \sqrt{7}) + (\sqrt{9} - \sqrt{8})$

$= \sqrt{9} - 1 = 3 - 1$

2

195. (a) $\sqrt{72 + \sqrt{72 + \sqrt{72} + \ldots}}$

[9] × 8

196. (a) According to question,

Thus. √33 =5.745

$\sqrt{\frac{3}{11}}$

$\rightarrow \sqrt{\frac{3\times11}{11\times11}} \rightarrow \sqrt{\frac{33}{11\times11}}$

$\rightarrow \frac{5.745}{11} \rightarrow 0.5223$

197. (c) The exponential from of

$\rightarrow \sqrt{\sqrt{2}\times\sqrt{3}} \rightarrow \sqrt{6^{\frac{1}{2}}}$

$\rightarrow \left(6^{\frac{1}{2}}\right)^{\frac{1}{2}} \rightarrow 6^{1/4}$

198. (c) $\frac{1}{1+\sqrt{2}+\sqrt{3}} + \frac{1}{1-\sqrt{2}+\sqrt{3}}$

$\rightarrow \frac{1}{1+\sqrt{3}+\sqrt{2}} + \frac{1}{1+\sqrt{3}-\sqrt{2}}$

$\rightarrow \frac{1+\sqrt{3}-\sqrt{2}+1\div\sqrt{3}+\sqrt{2}}{(1+\sqrt{3})^2-(\sqrt{2})^2}$

$\rightarrow \frac{2+2\sqrt{3}}{4+2\sqrt{3}-2} \rightarrow \frac{2+2\sqrt{3}}{2+2\sqrt{3}}$

$\rightarrow 1$

199. (c) $\sqrt{6+\sqrt{6}+\sqrt{6}+\ldots\ldots+\cdots}$

(2, 3) are the factor of 6.

If there is '+' in '√' Answer is Hieight value,

If there is '-' in '√', Answer is lowest value.

Alternative→

$x = \sqrt{6+\sqrt{6+\sqrt{6}}\ \ldots\ldots+..}$

(squareing both side)

$x^2 = 6\sqrt{6+\sqrt{6}+\cdots}$

$x^2 = 6 + x$

$\left[Thus,\ \sqrt{6+\sqrt{6}+\ldots.+\cdots}\right]$

$x^2 - x - 6 = 0$

$x^2 - 3x + 2x - 6 = 0$

$x(x - 3) + 2(x - 3) = 0$

$(x+ 2)(x - 3) = 0$

x is not equal to 2, & x = 3

So, Answer is = 3

200. (b) $\frac{3\sqrt{7}}{\sqrt{5}+\sqrt{2}} - \frac{5\sqrt{5}}{\sqrt{2}+\sqrt{7}} + \frac{2\sqrt{2}}{\sqrt{7}+\sqrt{5}}$

$= \frac{3\sqrt{7}}{\sqrt{5}+\sqrt{2}} \times \frac{\sqrt{5}-\sqrt{2}}{\sqrt{5}-\sqrt{2}} - \frac{5\sqrt{5}}{\sqrt{7}+\sqrt{2}} \times \frac{\sqrt{7}-\sqrt{2}}{\sqrt{7}-\sqrt{2}} +$

$\frac{2\sqrt{2}}{\sqrt{7}+\sqrt{5}} \times \frac{\sqrt{7}-\sqrt{2}}{\sqrt{7}+\sqrt{2}}$

$= \frac{3\sqrt{7}(\sqrt{5}-\sqrt{2})}{(\sqrt{5})^2-(\sqrt{2})^2} - \frac{5\sqrt{5}(\sqrt{7}-\sqrt{2})}{(\sqrt{7})^2-(\sqrt{2})^2}$

$+ \frac{2\sqrt{2}(\sqrt{7}-\sqrt{5})}{(\sqrt{7})^2-(\sqrt{5})^2}$

$= \sqrt{35} - \sqrt{14} - \sqrt{35} + \sqrt{10} + \sqrt{14} - \sqrt{10}$

= 0

201. (c) √4032 × √7

√4 × 9 × 4 × 4 × 7 × √7

= 4 × 2 × 3 × 7

= 168

4	4032
9	1008
4	112
4	28
	7

202. (d) 11√n = √112 + √343

11√n = √(2 × 2 × 2 × 2 × 7) + √(7 × 7 × 7)

11√n = 4√7 + 7√7

11√n = 11√7

√n = √7

n = 7

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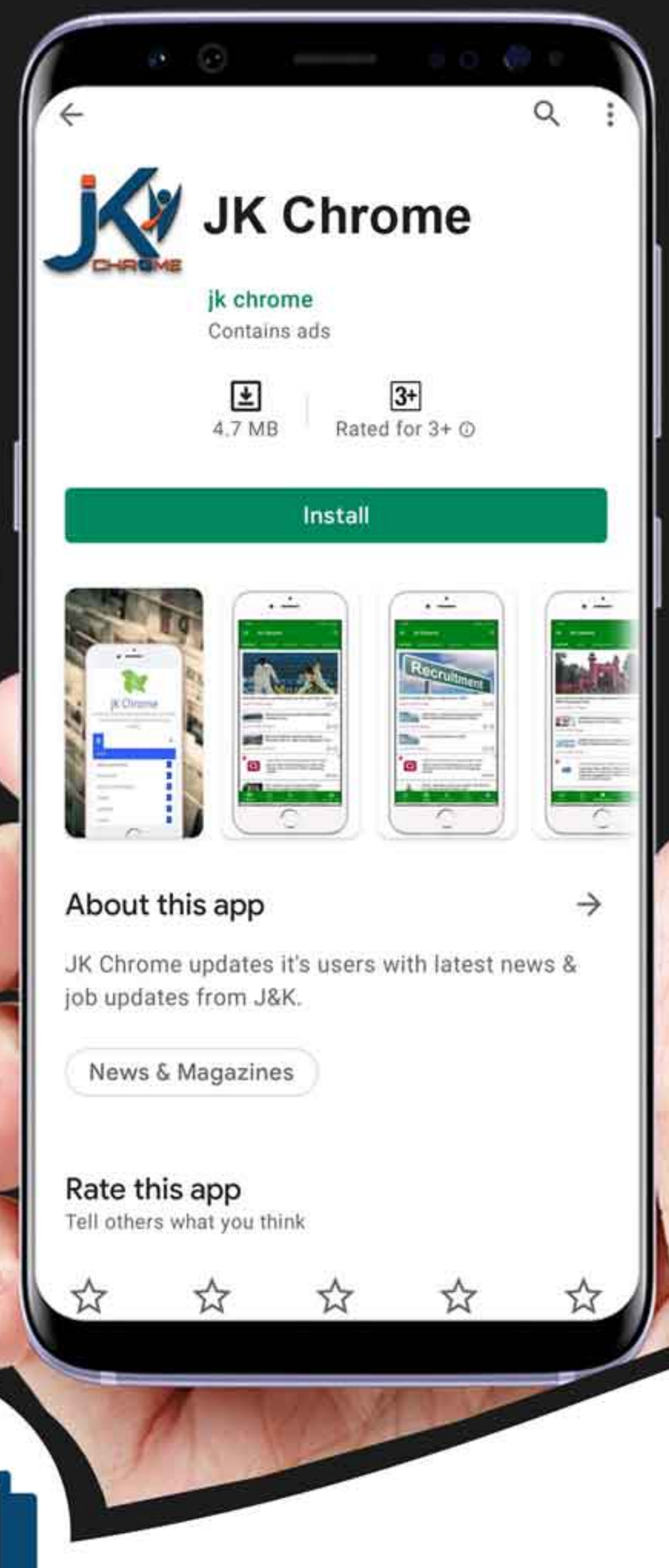

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