2 CHAPTER

POWER, INDICES & SURDS

EXERCISE

YEAR : 1999

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

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 $\sqrt{2^4}+\sqrt[3]{64}+\sqrt[4]{2^8}$ 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) $\frac{1}{2}-5\sqrt{3}$ (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) $\frac{1}{3}$ (d) 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) $\sqrt[3]{4}$

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

    $$\left[\sqrt[3]{\sqrt[6]{5^9}}\right]^4\left[\sqrt[3]{\sqrt[6]{5^9}}\right]^4$$

    (a) 5^2 (b) 5^4 (c) 5^8 (d) 5^{12}

14. If $27^{2n-1}=(243)^3$ then the value of n is:

    (a) 3 (b) 6 (c) 7

    (d) 9

15. If $3^{x+8}=27^{2x+1}$, then value of x is :

    (a) 7 (b) 3 (c) –2 (d) 1

YEAR : 2000

16. $\left(\sqrt{8}-\sqrt{4}-\sqrt{2}\right)$ equals:

    (a) $2-\sqrt{2}$ (b) $\sqrt{2}-2$

    (c) 2 (d) – 2

17. $8^{2/3}$ is equal to:

    (a) $5\frac{1}{2}$ (b) $21\frac{1}{3}$

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

18. The simplified form of $\left(16^{3/2}+16^{-3/2}\right)$ is:

    (a) 0 (b) $\frac{4097}{64}$

    (c) 1 (d) $\frac{16}{4097}$

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 (d) 0.04

    (c) 0.4 (d) 0.00004

21. $(16^{0.16}\times2^{0.36})$ is equal to

    (a) 2 (b) 16

    (c) 32 (d) 64

22. $(64)^{-\frac{2}{3}}\times\left(\frac{1}{4}\right)^{-2}$ is equal to:

    (a) 1 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{1}{16}$

23. $\left(\frac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}}+\frac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}\right)$ 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. $(6.5 \times 6.5 - 45.5 + 3.5 \times 3.5)$ is equal to:

(a) 10 (b) 9

(c) 7 (d) 6

27. $(7.5 \times 7.5 + 37.5 + 2.5 \times 2.5)$ is equal to:

(a) 100 (b) 80

(c) 60 (d) 30

28. $(36)^{\frac{1}{6}}$ is equal to:

(a) 1 (b) 6

(c) $\sqrt{6}$ (d) $\sqrt[3]{6}$

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

(a) $\frac{625}{16}$ (b) $\frac{625}{8}$

(c) $\frac{625}{32}$ (d) $\frac{16}{625}$

YEAR : 2002

30. The value of $(256)^{0.16}\times(16)^{0.18}$ is :

(a) 4 (b) – 4

(c) 16 (d) 256

31. The value of $\sqrt{\frac{\left(\sqrt{12}-\sqrt{8}\right)\left(\sqrt{3}+\sqrt{2}\right)}{5+\sqrt{24}}}$ is :

(a) $\sqrt{6}-\sqrt{2}$ (b) $\sqrt{6}+\sqrt{2}$

(c) $\sqrt{6}-2$ (d) $2-\sqrt{6}$

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

(a) 0 (b) 1

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

33. The value of $\frac{1}{\sqrt{\left(12-\sqrt{140}\right)}}-\frac{1}{\sqrt{\left(8-\sqrt{60}\right)}}-\frac{2}{\sqrt{10+\sqrt{84}}}$ is:

(a) 0 (b) 1

(c) 2 (d) 3

34. 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) $1+\sqrt{5}$

35. Simplify

$$\frac{(1.5)^3+(4.7)^3+(3.8)^3-3\times1.5\times4.7\times3.8}{(1.5)^2+(4.7)^2+(3.8)^2-1.5\times4.7-4.7\times3.8-3.8\times1.5}$$

(a) 0 (b) 1

(c) 10 (d) 30

36. Simplify:-

$$\frac{(6.25)^{\frac{1}{2}}(0.0144)^{\frac{1}{2}}+1}{(0.027)^{\frac{1}{3}}\times(81)^{\frac{1}{4}}}$$

(a) 0.14 (b) 1.4

(c) 1 (d) $1.\overline{4}$

37. Simplify :

$$\frac{0.41\times0.41\times0.41+0.69\times0.69\times0.69}{0.41\times0.41-0.41\times0.69+0.69+0.69}$$

(a) 0.28 (b) 1.41

(c) 1.1 (d) 2.8

38. 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

39. If $3^{10}\times 27^2 = 9^2 \times 3^n$ then the value of n is

(a) 10 (b) 12

(c) 15 (d) 30

(SSC CGL Pre Exam 2016)

40. The greatest among the numbers $(2.89)^{0.5}$, $2-(0.5)^2$, $1+\frac{0.5}{1-\frac{1}{2}}$, $\sqrt{3}$ is :

(a) (2.89)0.5 (b) $2-(0.5)^2$

(c) $1+\frac{0.5}{1-\frac{1}{2}}$, (d) $\sqrt{3}$

41. 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) $\sqrt[3]{2}$

42. If $(125)^{2/3}\times(625)^{-1/4}=(5)^x$, then the value of x is

(a) 3 (b) 2 (c) 0 (d) 1

43. The value of $\frac{(243)^{0.13}\times(243)^{0.07}}{(7)^{0.25}\times(49)^{0.075}\times(343)^{0.2}}$

(a) $\frac{3}{7}$ (b) $\frac{7}{3}$

(c) $1\frac{3}{7}$ (d) $2\frac{2}{7}$

44. The value of: $\sqrt{-\sqrt{3}+\sqrt{3+8\sqrt{7+4\sqrt{3}}}}$ is

(a) 1 (b) 2

(c) 3 (d) 8

45. $\sqrt{\sqrt[3]{0.004096}}$ is equal to

(a) 4 (b) 0.4

(c) 0.04 (d) 0.004

46. 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

47. $\frac{2.3\times2.3\times2.3-1}{2.3\times2.3+2.3+1}$ is equal to

(a) 1.3 (b) 3.3

(c) 0.3 (d) 2.2

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

49. 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) $\sqrt[5]{5}$

50. 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

51. If $\sqrt{15} = 3.88$, then what is the value of $\sqrt{\frac{5}{3}}$

(a) $1.29\overline{3}$ (b) 1.2934
(c) 1.29 (d) 1.295

52. The rationalising factor of $3\sqrt{3}$ is

(a) $\frac{1}{3}$ (b) 3
(c) -3 (d) $\sqrt{3}$

53. $\sqrt{2+\sqrt{2+\sqrt{2+.....}}}$ is equal to

(a) $\sqrt{2}$ (b) $2\sqrt{2}$
(c) 2 (d) 3

YEAR : 2004

54. 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

55. The value of

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

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

(a) 5.375 (b) 1
(c) 6 (d) 5

56. The value of

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

(a) 189 (b) 180
(c) 108 (d) 198

57. $\frac{\sqrt{5}}{\sqrt{3}+\sqrt{2}}-\frac{3\sqrt{3}}{\sqrt{5}+\sqrt{2}}+\frac{2\sqrt{2}}{\sqrt{5}+\sqrt{3}}$ is equal to:

(a) 0 (b) $2\sqrt{15}$
(c) $2\sqrt{10}$ (d) $2\sqrt{6}$

58. 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

59. $\frac{3^0+3^{-1}}{3^{-1}-3^0}$ is simplified to

(a) -2 (b) -1
(c) 1 (d) 2

60. $\frac{10.3\times10.3\times10.3+1}{10.3\times10.3-10.3+1}$ is equal to

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

61. $\frac{1.49\times14.9-0.51\times5.1}{14.9-5.1}$ is equal to:

(a) 0.20 (b) 20.00
(c) 2.00 (d) 22.00

62. $(0.04)^{-1.5}$ on simplification gives:

(a) 25 (b) 125
(c) 250 (d) 625

63. $\frac{(0.96)^3-(0.1)^3}{(0.96)^2+0.096+(0.1)^2}$ is simplified to:

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

64. The value of $\frac{64-0.008}{16+0.8+0.04}$ is:

(a) 2 (b) 3.8
(c) 0.6 (d) 4.2

YEAR : 2005

65. When $\left(4+\sqrt{7}\right)$ is presented in the form of perfect square it will be equal to :

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

(c) $\left\{\frac{1}{\sqrt{2}}\left(\sqrt{7}+1\right)\right\}^2$ (d) $\left(\sqrt{3}+\sqrt{4}\right)^2$

66. 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

67. $\left(\frac{1}{2}\right)^{\frac{1}{2}}$ is equal to

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

68. $\frac{1}{\sqrt{3}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{6}}$

$+\frac{1}{\sqrt{6}+\sqrt{7}}+\frac{1}{\sqrt{7}+\sqrt{8}}+\frac{1}{\sqrt{8}+\sqrt{9}}$ is

(a) $\sqrt{3}$ (b) $3\sqrt{3}$
(c) $3-\sqrt{3}$ (d) $5-\sqrt{3}$

69. $(16)^{0.16}\times(16)^{0.04}\times(2)^{0.2}$ is equal to:

(a) 1 (b) 2 (c) 4 (d) 16

70. Simplify :-

$\frac{1}{\sqrt{100}-\sqrt{99}}-\frac{1}{\sqrt{99}-\sqrt{98}}$

$+\frac{1}{\sqrt{98}-\sqrt{97}}-\frac{1}{\sqrt{97}-\sqrt{96}}$

$+\ldots.+\frac{1}{\sqrt{2}-\sqrt{1}}$

(a) 10 (b) 9
(c) 13 (d) 11

71. $\left[\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}}+\frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}}\right]$ in simplified form equals to:

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

72. $\left[\sqrt[3]{2}\times\sqrt{2}\times\sqrt[3]{3}\times\sqrt{3}\right]$ is equal to

(a) 6^5 (b) $6^{5/6}$
(c) 6 (d) None of these

73. $\left\{(-2)^{(-2)}\right\}^{(-2)}$ is equal to:

(a) 16 (b) 8
(c) -8 (d) -1

74. 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

75. $\frac{(2.3)^3+0.027}{(2.3)^2-0.69+0.09}$ is equal to :

(a) 2.60 (b) 2.00
(c) 2.33 (d) 2.80

76. $\frac{5.71\times5.71\times5.71-2.79\times2.79\times2.79}{5.71\times5.71+5.71\times2.79+2.79\times2.79}$ in simplified form is :

(a) 8.5 (b) 8.6
(c) 2.82 (d) 2.92

77. 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

78. $\left[\frac{(0.73)^3+(0.27)^3}{(0.73)^2+(0.27)^2-(0.73)\times(0.27)}\right]$ simplifies to

(a) 1 (b) 0.4087

(c) 0.73 (d) 0.27

79. $[3-4(3-4)^{-1}]^{-1}$ is equal to :

(a) 7 (b) –7

(c) $\frac{1}{7}$ (d) $-\frac{1}{7}$

80. 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

81. The smallest among $\sqrt{8}+\sqrt{5}$, $\sqrt{7}+\sqrt{6}$, $\sqrt{10}+\sqrt{3}$ and $\sqrt{11}+\sqrt{2}$ is:

(a) $\sqrt{8}+\sqrt{5}$ (b) $\sqrt{7}+\sqrt{6}$

(c) $\sqrt{10}+\sqrt{3}$ (d) $\sqrt{11}+\sqrt{2}$

82. 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) $\sqrt[6]{6}$

83. Which is the greatest among $\left(\sqrt{19}-\sqrt{17}\right)$, $\left(\sqrt{13}-\sqrt{11}\right)$, $\left(\sqrt{7}-\sqrt{5}\right)$ and $\left(\sqrt{5}-\sqrt{3}\right)$?

(a) $\sqrt{19}-\sqrt{17}$ (b) $\sqrt{13}-\sqrt{11}$

(c) $\sqrt{7}-\sqrt{5}$ (d) $\sqrt{5}-\sqrt{3}$

84. 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

85. The value of $(d^{s+t} \div d^s) \div d^t$ would be

(a) $d^{2(s+t)}$ (b) 1

(c) 0 (d) d^{s-t}

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86. 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) equals:

(a) 8 (b) 16

(c) $2\sqrt{15}$ (d) $2\left(\sqrt{5}+\sqrt{3}\right)$

87. Which of the following is closest to $\sqrt{3}$?

(a) $\frac{9}{5}$ (b) 1.75

(c) $\frac{173}{100}$ (d) 1.69

YEAR : 2006

88. $0.75 \times 0.75 - 2 \times 0.75 \times 0.25 + 0.25 \times 0.25$ is equal to

(a) 250 (b) 2500

(c) 2.5 (d) 0.25

89. The greatest one among $\sqrt{4}$, $\sqrt[3]{4}$, $\sqrt[4]{6}$ and $\sqrt[6]{8}$ is

(a) $\sqrt{4}$ (b) $\sqrt[3]{4}$

(c) $\sqrt[4]{6}$ (d) $\sqrt[6]{8}$

YEAR : 2007

90. $\frac{12}{3+\sqrt{5}+2\sqrt{2}}$ 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) $1-\sqrt{5}-\sqrt{2}+\sqrt{10}$

91. $\left(3+\frac{1}{\sqrt{3}}+\frac{1}{3+\sqrt{3}}+\frac{1}{\sqrt{3}-3}\right)$ is equal to

(a) 1 (b) 3

(c) $3+\sqrt{3}$ (d) $3-\sqrt{3}$

92. $\sqrt{8-2\sqrt{15}}$ is equal to:

(a) $\sqrt{5}+\sqrt{3}$ (b) $5-\sqrt{3}$

(c) $\sqrt{5}-\sqrt{3}$ (d) $3-\sqrt{5}$

93. $\left[8-\left(\frac{4^{\frac{9}{4}}\sqrt{2.2^2}}{2\sqrt{2^{-2}}}\right)^{\frac{1}{2}}\right]$ is equal to

(a) 32 (b) 8

(c) 1 (d) 0

94. $\frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}}-\frac{2\sqrt{6}}{\sqrt{3}+1}+\frac{2\sqrt{3}}{\sqrt{6}+2}$ is equal to

(a) 3 (b) 2

(c) 0 (d) $\sqrt{3}$

95. $\left(\frac{1}{1.4}+\frac{1}{4.7}+\frac{1}{7.10}+\frac{1}{10.13}+\frac{1}{13.16}\right)$ is equal to

(a) $\frac{1}{3}$ (b) $\frac{5}{16}$

(c) $\frac{3}{8}$ (d) $\frac{41}{7280}$

96. $\frac{137\times137+133\times133+18221}{137\times137\times137-133\times133\times133}$ is equal to

(a) 4 (b) 270

(c) $\frac{1}{4}$ (d) $\frac{1}{270}$

97. $\left(\frac{2.75\times2.75\times2.75-2.25\times2.25\times2.25}{2.75\times2.75+2.75\times2.25+2.25\times2.25}\right)$ is equal to :

(a) – 5 (b) 0.5

(c) – 0.5 (d) 5

98. 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) $\sqrt{11}-\sqrt{9}$

99. Greatest among the numbers $\sqrt[3]{9}, \sqrt{3}, \sqrt[4]{16}, \sqrt[6]{80}$ is

(a) $\sqrt[3]{9}$ (b) $\sqrt{3}$

(c) $\sqrt[4]{16}$ (d) $\sqrt[6]{80}$

100. The least one among $2\sqrt{3}$, $2\sqrt[4]{5}$, $\sqrt{8}$ and $3\sqrt{2}$ is

(a) $2\sqrt{3}$ (b) $2\sqrt[4]{5}$

(c) $\sqrt{8}$ (d) $3\sqrt{2}$

101. Given that $\sqrt{3}$ =1.732, Then the value of $\frac{3+\sqrt{6}}{5\sqrt{3}-2\sqrt{12}-\sqrt{32}+\sqrt{50}}$ is:

(a) 4.899 (b) 2.551

(c) 1.414 (d) 1.732

102. Given that $\sqrt{5}$ = 2.236 and $\sqrt{3}$ =1.732, Then the value of $\frac{1}{\sqrt{5}+\sqrt{3}}$ is

(a) 0.564 (b) 0.504

(c) 0.252 (d) 0.202

103. $2\sqrt[3]{32} - 3\sqrt[3]{4} + \sqrt[3]{500} = ?$

(a) $4\sqrt[3]{6}$ (b) $3\sqrt{24}$

(c) $6\sqrt[3]{4}$ (d) 916

104. $\sqrt{12 + \sqrt{12 + \sqrt{12 + ...}}}$ is equal to

(a) 3 (b) 4

(c) 6 (d) 2

105. If $a = \frac{\sqrt{3}}{2}$, then the value of $\sqrt{1+a} + \sqrt{1-a}$ is :

(a) $\sqrt{3}$ (b) $\frac{\sqrt{3}}{2}$

(c) $2 + \sqrt{3}$ (d) $2 - \sqrt{3}$

106. If $a = \frac{\sqrt{5}+1}{\sqrt{5}-1}$, $b = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, then the value of $\left(\frac{a^2 + ab + b^2}{a^2 - ab + b^2}\right)$ is

(a) $\frac{3}{4}$ (b) $\frac{4}{3}$

(c) $\frac{3}{5}$ (d) $\frac{5}{3}$

YEAR : 2008

107. $(0.04)^{-(1.5)}$ is equal to

(a) 25 (b) 125

(c) 60 (d) 5

108. The value of $\sqrt[3]{1372} \times \sqrt[3]{1458} \div \sqrt[3]{343}$ is .

(a) 18 (b) 15

(c) 13 (d) 12

109. $\left(\frac{2}{\sqrt{5}+\sqrt{3}} - \frac{3}{\sqrt{6}-\sqrt{3}} + \frac{1}{\sqrt{6}+\sqrt{5}}\right)$ is equal to

(a) $-2\sqrt{6}$ (b) $-2\sqrt{5}$

(c) $-2\sqrt{3}$ (d) 0

110. $\left[\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} - \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}\right]$ simplifies to

(a) $2\sqrt{6}$ (b) $4\sqrt{6}$

(c) $2\sqrt{3}$ (d) $3\sqrt{2}$

111. $\frac{1}{\sqrt{9}-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-\sqrt{4}}$ is equal to:

$\frac{1}{\sqrt{9}-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}}$

(a) 5 (b) 1

(c) 3 (d) 0

112. $\left(\sqrt{2} + \sqrt{7 - 2\sqrt{10}}\right)$ is equal to

(a) $\sqrt{2}$ (b) $\sqrt{7}$

(c) $\sqrt{5}$ (d) $2\sqrt{5}$

113. If $(2^3)^2 = 4^x$ then 3^x is equal to

(a) 3 (b) 6

(c) 9 (d) 27

(SSC CGL Pre Exam 2016)

114. $\frac{(5.624)^3 + (4.376)^3}{5.624 \times 5.624 - (5.624 \times 4.376) + 4.376 \times 4.376}$

is equal to

(a) 10 (b) 1.248

(c) 20.44 (d) 1

115. $\frac{(998)^2 - (997)^2 - 45}{(98)^2 - (97)^2} = ?$

(a) 1995 (b) 195

(c) 95 (d) 10

116. 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

117. 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

118. 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

119. If $x = 1 + \sqrt{2} + \sqrt{3}$, then the value of $\left(x + \frac{1}{x-1}\right)$ is

(a) $1 + 2\sqrt{3}$ (b) $2 + \sqrt{3}$

(c) $3 + \sqrt{2}$ (d) $2\sqrt{3} - 1$

120. 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

121. 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

YEAR : 2009

122. $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = ?$

(a) 5 (b) 4

(c) 3 (d) 2

123. $(256)^{0.16} \times (4)^{0.36}$ is equal to

(a) 64 (b) 16

(c) 256.25 (d) 4

124. The value of $\frac{(0.337 + 0.126)^2 - (0.337 - 0.126)^2}{0.337 \times 0.126}$ is

(a) 4 (b) 0.211

(c) 0.463 (d) 0.4246

125. Evaluate :

$16\sqrt{\frac{3}{4}} - 9\sqrt{\frac{4}{3}}$ if $\sqrt{12} = 3.46$

(a) 3.46 (b) 10.38

(c) 13.84 (d) 24.22

126. If $3^{x+y} = 81$ and $81^{x-y} = 3$, then the value of x is

(a) 42 (b) $\frac{15}{8}$

(c) $\frac{17}{8}$ (d) 39

YEAR : 2010

127. $\frac{3\sqrt{2}+2\sqrt{3}}{3\sqrt{2}-2\sqrt{3}}$ is equal to

(a) $5+2\sqrt{6}$ (b) $\frac{3+2\sqrt{6}}{2}$

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

128. 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) $\frac{1}{x}$

129. $\left[\frac{\sqrt{3}+1}{\sqrt{3}-1}+\frac{\sqrt{2}+1}{\sqrt{2}-1}+\frac{\sqrt{3}-1}{\sqrt{3}+1}+\frac{\sqrt{2}-1}{\sqrt{2}+1}\right]$ is simplified to

(a) 10 (b) 12

(c) 14 (d) 18

130. Find the value of x in the expression : $\sqrt[4]{3x+1}=2$

(a) 3 (b) 6

(c) 4 (d) 5

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

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

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

132. $\left(\frac{2}{\sqrt{6}+2}+\frac{1}{\sqrt{7}+\sqrt{6}}+\frac{1}{\sqrt{8}-\sqrt{7}}+2-2\sqrt{2}\right)$ is equal to

(a) 0 (b) $2\sqrt{2}$

(c) $\sqrt{2}$ (d) $2\sqrt{7}$

133. $\left[\left\{\left(-\frac{1}{2}\right)^2\right\}^{-2}\right]^{-1}$ is equal to:

(a) $\frac{1}{16}$ (b) 16

(c) $-\frac{1}{16}$ (d) -16

134. $\frac{256\times256-144\times144}{112}$ is equal to

(a) 420 (b) 400

(c) 360 (d) 320

135. $[8.7\times8.7+2\times8.7\times1.3+1.3\times1.3]$ is equal to

(a) 1.69 (b) 10

(c) 75.69 (d) 100

136. $\frac{(3.06)^3-(1.98)^3}{(3.06)^2+3.06\times1.98+(1.98)^2}$ is equal to

(a) 1.08 (b) 5.04

(c) 2.16 (d) 1.92

137. $\frac{3.25\times3.25+1.75\times1.75-2\times3.25\times1.75}{3.25\times3.25-1.75\times1.75}$ is simplified to

(a) 0.5 (b) 0.4 (c) 0.3 (d) 0.2

138. $\frac{0.08\times0.08\times0.08+0.02\times0.02\times0.02}{0.08\times0.08-0.0016+0.02\times0.02}$ is simplified to :

(a) 0.001 (b) 0.1

(c) 0.0016 (d) 0.016

139. 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}

140. 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) $\sqrt[4]{5}$

141. The largest among the numbers 0.9, $(0.9)^2$, $\sqrt{0.9}, 0.\overline{9}$ is :

0.9, $(0.9)^2$, $\sqrt{0.9}, 0.\overline{9}$

(a) 0.9 (b) $(0.9)^2$

(c) $\sqrt{0.9}$ (d) $0.\overline{9}$

142. If $3^{x+3}\times9^{2x-5}=3^{3x+7}$ then the value of × is:

(a) 5 (b) 6

(c) 7 (d) 8

(SSC CPO(Re) 07-06-2016, Evening)

143. $\sqrt{3\sqrt{3\sqrt{3.....}}}$ is equal to

(a) $\sqrt{3}$ (b) 3

(c) $2\sqrt{3}$ (d) $3\sqrt{3}$

144. 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) $2\sqrt{3}-3\sqrt{2}$

YEAR : 2011

145. 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) $2+\sqrt{3}$

146. The square root of $14+6\sqrt{5}$ is

(a) $2+\sqrt{5}$ (b) $3+\sqrt{5}$

(c) $5+\sqrt{3}$ (d) $3+2\sqrt{5}$

147. The value of $\frac{3\sqrt{2}}{\sqrt{3}+\sqrt{6}}-\frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}}+\frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}}$ is

(a) 4 (b) 0

(c) $\sqrt{2}$ (d) $3\sqrt{6}$

148. The value of $\frac{1}{\sqrt{2}+1}+\frac{1}{\sqrt{3}+\sqrt{2}}+\frac{1}{\sqrt{4}+\sqrt{3}}+....+\frac{1}{\sqrt{100}+\sqrt{99}}$ is

(a) 1 (b) 9

(c) $\sqrt{199}$ (d) $\sqrt{99}-1$

149. $\frac{(0.05)^2+(0.41)^2+(0.073)^2}{(0.005)^2+(0.041)^2+(0.0073)^2}=?$

(a) 10 (b) 100

(c) 1000 (d) None of these

150. If $3^{x+y}=81$ and $81^{x-y}=3$, then the value of $\frac{x}{y}$ is

(a) $\frac{15}{17}$ (b) $\frac{17}{30}$

(c) $\frac{15}{34}$ (d) $\frac{17}{15}$

(SSC CPO 20-03-2016, Morning)

151. 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) $\sqrt[5]{32}$

152. 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) $\sqrt[19]{12}$

153. 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) $2\sqrt{20}$

154. The greatest among the numbers

$\sqrt{0.09}, \sqrt[3]{0.064}$, 0.5 and $\frac{3}{5}$ is

(a) $\sqrt{0.09}$ (b) $\sqrt[3]{0.064}$

(c) 0.5 (d) $\frac{3}{5}$

155. The greatest among 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) $(0.16)^2$

156. The greatest among the numbers

$\sqrt[2]{8}$, $\sqrt[4]{13}$, $\sqrt[5]{16}$, $\sqrt[10]{41}$ is:

(a) $\sqrt[4]{13}$ (b) $\sqrt[5]{16}$

(c) $\sqrt[10]{41}$ (d) $\sqrt[2]{8}$

157. 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

158. 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) $\sqrt{2}-\sqrt{3}$

159. If $0.42 \times 100^k = 42$, then the value of k is :

(a) 4 (b) 2

(c) 1 (d) 3

160. If $2^x = 3^y = 6^{-z}$ then $\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$ is equal to

(a) 0 (b) 1

(c) $\frac{3}{2}$ (d) $-\frac{1}{2}$

YEAR : 2012

161. $\left(\frac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}}+\frac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}\right)$ simplifies to

(a) $\sqrt{5}+\sqrt{6}$ (b) $2\sqrt{5}+\sqrt{6}$

(c) $\sqrt{5}-\sqrt{6}$ (d) $2\sqrt{5}-3\sqrt{6}$

SSC FCI Assistant Grade III 25/02/2012

162. When simplified $256^{-\left[4^{-3/2}\right]}$ is equal to

(a) 8 (b) $\frac{1}{8}$

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

SSC FCI Assistant Grade III 25/02/2012

163. $2\sqrt[3]{40} - 4\sqrt[3]{320} + 3\sqrt[3]{625} - 3\sqrt[3]{5}$ is equal to

(a) $-2\sqrt[3]{340}$ (b) 0

(c) $\sqrt[3]{340}$ (d) $\sqrt[3]{660}$

SSC CGL TIER 16/09/2012

164. The value of $\sqrt[3]{0.000125}$ is

(a) 0.005 (b) 0.05

(c) 0.5 (d) 0.005

SSC FCI Assistant Grade III 11/11/2012

165. $\frac{0.355 \times 0.5555 \times 2.025}{0.225 \times 1.775 \times 0.2222}$ is equal to

(a) 5.4 (b) 4.58

(c) 4.5 (d) 5.45

SSC CHSL DEO & LDC 04/11/2012

YEAR : 2013

166. The value of $\sqrt{40+\sqrt{9\sqrt{81}}}$ is

(a) $\sqrt{111}$ (b) 9

(c) 7 (d) 11

SSC CHSL DEO & LDC 20/10/2013

167. If $\frac{\left(x-\sqrt{24}\right)\left(\sqrt{75}+\sqrt{50}\right)}{\sqrt{75}-\sqrt{50}} = 1$, then the value of x is

(a) $\sqrt{5}$ (b) 5

(c) $2\sqrt{5}$ (d) $3\sqrt{5}$

SSC CHSL DEO & LDC 27/10/2013

168. Evaluate

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

(a) $\sqrt{2}$ (b) $\sqrt{3}$

(c) 0 (d) $2\sqrt{2}$

SSC CHSL DEO & LDC 27/10/2013

169. Let $a = \frac{1}{2-\sqrt{3}}+\frac{1}{3-\sqrt{8}}+\frac{1}{4-\sqrt{15}}$ then we have

(a) a < 18 but $a \neq 9$

(b) a > 18

(c) a = 18

(d) a =9

SSC CHSL DEO & LDC 10/11/2013

170. If a, b are rationals and $a\sqrt{2}+b\sqrt{3} = \sqrt{98}+\sqrt{108}-\sqrt{48}-\sqrt{72}$, then the values of a, b are respectively

(a) 1, 2 (b) 1, 3

(c) 2, 1 (d) 2 , 3

SSC CHSL DEO & LDC 10/11/2013

171. 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) $a = 729$

SSC CHSL DEO & LDC 10/11/2013

172. The value of

$$\frac{\sqrt{72}\times\sqrt{363}\times\sqrt{175}}{\sqrt{32}\times\sqrt{147}\times\sqrt{252}}$$ is

(a) $\frac{55}{42}$ (b) $\frac{45}{56}$

(c) $\frac{45}{28}$ (d) $\frac{55}{28}$

SSC MTS 10/03/2013

173. $2+\frac{6}{\sqrt{3}}+\frac{1}{2+\sqrt{3}}+\frac{1}{\sqrt{3}-2}$ equals to

(a) $+\left(2\sqrt{3}\right)$ (b) $-\left(2+\sqrt{3}\right)$

(c) 1 (d) 2

SSC CGL TIER 21/04/2013

174. 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) $3\sqrt{3}-\sqrt{7}$

SSC CGL TIER 19/05/2013

175. 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

SSC CGL TIER 19/05/2013

176. If $_{11}\sqrt{n} = \sqrt{112} + \sqrt{343}$, then the value of n is:

(a) 3 (b) 11

(c) 13 (d) 7

(SSC LDC 20-12-2015, Evening)

177. The smallest among the numbers

2^{250}, 3^{150}, 5^{100} and 4^{200} is

(a) 4^{200} (b) 5^{100}

(c) 3^{150} (d) 2^{250}

(SSC CHSL DEO & LDC 10/11/2013)

178. Which is greater $\sqrt[3]{2}$ or $\sqrt{3}$?

(a) Cannot be compared

(b) $\sqrt[3]{2}$ (c) $\sqrt{3}$

(d) Equal

SSC CHSL DEO & LDC 20/10/2013

179. The total number of prime factors in $4^{10} \times 7^3 \times 16^2 \times 11 \times 10^2$ is

(a) 34 (b) 35

(c) 36 (d) 37

SSC CHSL DEO & LDC 27/11/2013

180. The number of prime factors in $6^{333} \times 7^{222} \times 8^{111}$

(a) 1221 (b) 1222

(c) 1111 (d) 1211

SSC CHSL DEO & LDC 10/11/2013

181. Find the value of

$\sqrt{30 + \sqrt{30 + \sqrt{30 + \ldots.}}}$

(a) 5 (b) $3\sqrt{10}$

(c) 6 (d) 7

SSC CGL TIER II EXAM 29/09/2014

182. The value of $\sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4}}}\ldots\ldots\ldots\ldots}$ is

(a) 2 (b) 2^2

(c) 2^3 (d) 2^5

SSC CGL TIER II EXAM 29/09/2014

183. $55^3 + 17^3 - 72^3 + 201960$ is equal to

(a) – 1 (b) 0

(c) 1 (d) 17

SSC CGL TIER I RE EXAM(2013) 27/04/2014

184. $\sqrt{4032} \times \sqrt{7} =$

(a) $36\sqrt{2}$ (b) $24\sqrt{7}$

(c) 168 (d) 252

(SSC LDC 20-12-2015, Evening)

185. The value of $\dfrac{(243)^{\frac{n}{5}} \times 3^{2n+1}}{9^n \times 3^{n-1}}$ is

(a) 3 (b) 9

(c) 6 (d) 12

SSC CGL TIER I EXAM 26/10/2014

186. The simplified value of

$\left(\sqrt{3}+1\right)\left(10+\sqrt{12}\right)\left(\sqrt{12}-2\right)\left(5-\sqrt{3}\right)$ is

(a) 16 (b) 88

(c) 176 (d) 132

SSC CAPFs, CISF ASI & DELHI POLICE EXAM 16/11/2014

187. The simplified value of $(0.2)^3 \times 200 \div 2000$ of $(0.2)^2$ is

(a) $\dfrac{1}{100}$ (b) $\dfrac{1}{50}$

(c) $\dfrac{1}{10}$ (d) 1

SSC CHSL DEO EXAM 16/11/2014

188. Arranging the following in descending order, we get

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

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

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

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

(d) $\sqrt[6]{3} > \sqrt[4]{5} > \sqrt[3]{4} < \sqrt{2}$

SSC CGL TIER EXAM 19/10/2014

189. 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) $-\sqrt{3}$

SSC CGL TIER I RE EXAM (2013) 27/07/2014

190. If $2^{n-1} + 2^{n+1} = 320$, then the value of n is

(a) 6 (b) 8

(c) 5 (d) 7

SSC CGL TIER I RE EXAM (2013) 27/07/2014

191. $4^{61}+4^{62}+4^{63}+4^{64}$ is divisible by

(a) 17 (b) 3

(c) 11 (d) 13

SSC CGL TIER I RE EXAM (2013) 20/07/2014

192. If $_{5}\sqrt{5} \times 5^3 \div 5^{-\frac{3}{2}} = 5^{a+2}$, then the value of a is

(a) 4 (b) 5 (c) 6 (d) 8

SSC CGL EXAM 19/10/2014

(SSC LDC 20-12-2015, Morning)

193. The value of

$\dfrac{3\sqrt{7}}{\sqrt{5}+\sqrt{2}} - \dfrac{5\sqrt{5}}{\sqrt{2}+\sqrt{7}} + \dfrac{2\sqrt{2}}{\sqrt{7}+\sqrt{5}}$ is:

(a) 1 (b) 0

(c) $2\sqrt{3}$ (d) $\sqrt{7}$

(SSC LDC 20-12-2015, Evening)

194. $3^x - 3^{x-1} = 486$, Find x

(a) 7 (b) 9

(c) 5 (d) 6

SSC CGL EXAM 26/10/2014

195. 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 start is

(a) 0 cm (b) 1 cm

(c) 2 cm (d) 4 cm

SSC CAPFs, CISF ASI & DP SI EXAM 21/06/2014

196. The value of

$\dfrac{1}{\sqrt{7}-\sqrt{6}} - \dfrac{1}{\sqrt{6}-\sqrt{5}} + \dfrac{1}{\sqrt{5}-2} - \dfrac{1}{\sqrt{8}-\sqrt{7}} + \dfrac{1}{3-\sqrt{8}}$ is

(a) 0 (b) 1

(c) 5 (d) 7

(SSC CGL 09-08-2015, Morning)

197. Choose the incorrect relation(s) from the following;

(i) $\sqrt{6}+\sqrt{2} = \sqrt{5}+\sqrt{3}$

(ii) $\sqrt{6}+\sqrt{2} < \sqrt{5}+\sqrt{3}$

(iii) $\sqrt{6}+\sqrt{2} > \sqrt{5}+\sqrt{3}$

(a) (i) (b) (ii)

(c) (i) and (iii) (d) (ii) and (iii)

(SSC CGL 09-08-2015, Morning)

198. $\dfrac{\sqrt{10+\sqrt{25+\sqrt{108+\sqrt{154+\sqrt{225}}}}}}{\sqrt[3]{8}} = ?$

(a) 8 (b) 4

(c) 1/2 (d) 2

(CPO 21-06-2015, Morning)

199. The value of the expression $\sqrt{6+\sqrt{6+\sqrt{6+\ldots+\text{upto}\infty}}}$ is

(a) 30 (b) 5

(c) 3 (d) 2

200. 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

(CPO 21-06-2015, Evening)

201. $\frac{6^2+7^2+8^2+9^2+10^2}{\sqrt{7+4\sqrt{3}}-\sqrt{4+2\sqrt{3}}}$ is equal to

(a) 330 (b) 355

(c) 305 (d) 366

(CGL Mains 25-10-2015)

202. $(3x-2y) : (2x+3y) = 5 : 6$, then one of the value of $\left(\frac{\sqrt[3]{x}+\sqrt[3]{y}}{\sqrt[3]{x}-\sqrt[3]{y}}\right)^2$ is

(a) $\frac{1}{25}$ (b) 5

(c) $\frac{1}{5}$ (d) 25

(CGL Mains 25-10-2015)

203. The value of

$$\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{6}}+\frac{1}{\sqrt{6}+\sqrt{7}}+\frac{1}{\sqrt{7}+\sqrt{8}}+\frac{1}{\sqrt{8}+\sqrt{9}}$$ is

(a) 2 (b) 4

(c) 0 (d) 1

(CGL Mains 12-04-2015)

204. The value of $\sqrt{72+\sqrt{72+\sqrt{72+\ldots.}}}$ is

(a) 9 (b) 18

(c) 8 (d) 12

(CGL Mains 12-04-2015)

205. If $\sqrt{33}=5.745$, then the value of the following is approximately:

(a) 0.5223 (b) 6.32

(c) 2.035 (d) 1

(SSC LDC 12-04-2015, Evening)

206. The exponential form of $\sqrt{\sqrt{2}\times\sqrt{3}}$ is:

(a) $6^{-1/2}$ (b) $6^{1/2}$

(c) $6^{1/4}$ (d) 6

(SSC LDC 15-11-2015, Morning)

207. 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) $4\left(\sqrt{3}+\sqrt{2}\right)$

(SSC LDC 06-12-2015, Morning)

ANSWER KEY

1.	(c)	22.	(a)	43.	(a)	64.	(b)	85.	(b)	106.	(b)	127.	(a)	148.	(b)	169.	(a)	190.	(d)
2.	(a)	23.	(c)	44.	(b)	65.	(c)	86.	(a)	107.	(b)	128.	(d)	149.	(b)	170.	(a)	191.	(a)
3.	(a)	24.	(c)	45.	(b)	66.	(d)	87.	(c)	108.	(a)	129.	(a)	150.	(d)	171.	(a)	192.	(a)
4.	(c)	25.	(b)	46.	(b)	67.	(a)	88.	(d)	109.	(c)	130.	(d)	151.	(b)	172.	(d)	193.	(b)
5.	(c)	26.	(b)	47.	(a)	68.	(c)	89.	(a)	110.	(b)	131.	(a)	152.	(b)	173.	(d)	194.	(d)
6.	(b)	27.	(a)	48.	(b)	69.	(b)	90.	(b)	111.	(a)	132.	(d)	153.	(c)	174.	(c)	195.	(b)
7.	(d)	28.	(d)	49.	(b)	70.	(d)	91.	(b)	112.	(c)	133.	(a)	154.	(d)	175.	(b)	196.	(c)
8.	(c)	29.	(a)	50.	(a)	71.	(c)	92.	(c)	113.	(d)	134.	(b)	155.	(b)	176.	(d)	197.	(c)
9.	(c)	30.	(a)	51.	(a)	72.	(b)	93.	(d)	114.	(a)	135.	(d)	156.	(d)	177.	(b)	198.	(d)
10.	(c)	31.	(c)	52.	(d)	73.	(a)	94.	(c)	115.	(d)	136.	(a)	157.	(b)	178.	(c)	199.	(c)
11.	(b)	32.	(c)	53.	(c)	74.	(d)	95.	(b)	116.	(b)	137.	(c)	158.	(a)	179.	(c)	200.	(d)
12.	(a)	33.	(a)	54.	(a)	75.	(a)	96.	(c)	117.	(a)	138.	(b)	159.	(c)	180.	(a)	201.	(a)
13.	(b)	34.	(a)	55.	(c)	76.	(d)	97.	(b)	118.	(b)	139.	(b)	160.	(a)	181.	(c)	202.	(d)
14.	(a)	35.	(c)	56.	(d)	77.	(c)	98.	(b)	119.	(a)	140.	(d)	161.	(c)	182.	(a)	203.	(a)
15.	(d)	36.	(d)	57.	(a)	78.	(a)	99.	(a)	120.	(c)	141.	(d)	162.	(d)	183.	(b)	204.	(a)
16.	(b)	37.	(c)	58.	(a)	79.	(c)	100.	(c)	121.	(d)	142.	(c)	163.	(b)	184.	(c)	205.	(a)
17.	(c)	38.	(c)	59.	(a)	80.	(b)	101.	(d)	122.	(a)	143.	(b)	164.	(b)	185.	(b)	206.	(c)
18.	(b)	39.	(b)	60.	(c)	81.	(d)	102.	(c)	123.	(d)	144.	(c)	165.	(c)	186.	(c)	207.	(c)
19.	(b)	40.	(c)	61.	(c)	82.	(b)	103.	(c)	124.	(a)	145.	(a)	166.	(c)	187.	(b)		
20.	(c)	41.	(a)	62.	(b)	83.	(d)	104.	(b)	125.	(a)	146.	(b)	167.	(b)	188.	(a)		
21.	(a)	42.	(d)	63.	(c)	84.	(c)	105.	(a)	126.	(c)	147.	(b)	168.	(c)	189.	(d)		

EXPLANATION

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

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

$\Rightarrow \mathbf{\sqrt{3}+2\sqrt{2}}$

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

$\Rightarrow \left(\sqrt{3}+\sqrt{2}\right)-\dfrac{1}{\left(\sqrt{3}+\sqrt{2}\right)}$

$\left[\sqrt{5+2\sqrt{6}}=\sqrt{\left(\sqrt{3}+\sqrt{2}\right)^2}\Rightarrow\sqrt{3}+\sqrt{2}\right]$

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

$\Rightarrow \sqrt{3}+\sqrt{2}-\left(\dfrac{1}{\sqrt{3}+\sqrt{2}}\times\dfrac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}}\right)$

$\Rightarrow \sqrt{3}+\sqrt{2}-\left(\dfrac{\sqrt{3}-\sqrt{2}}{3-2}\right)$

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

$\Rightarrow \mathbf{2\sqrt{2}}$

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

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

$\Rightarrow 2^2+4^1+2^2$

$\Rightarrow 4+4+4=12$

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

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

$\Rightarrow 4\sqrt[3]{4}-3\sqrt[3]{4}+5\sqrt[3]{4}$

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

$\Rightarrow 6\mathbf{\sqrt[3]{4}}$

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

$\Rightarrow \dfrac{\dfrac{3\left(2-\sqrt{3}\right)-2\left(2+\sqrt{3}\right)}{\left(2+\sqrt{3}\right)\left(2-\sqrt{3}\right)}}{2-5\sqrt{3}}$

$\Rightarrow \dfrac{6-3\sqrt{3}-4-2\sqrt{3}}{\left(2+\sqrt{3}\right)\left(2-\sqrt{3}\right)\left(2-5\sqrt{3}\right)}$

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

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

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

$\Rightarrow 243^{0.20}$

$\Rightarrow 243^{\frac{20}{100}}\Rightarrow 243^{\frac{1}{5}}$

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

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

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

$\Rightarrow 256^{0.25}\Rightarrow 256^{\frac{1}{4}}$

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

8. (c)

$\dfrac{0.06\times0.06\times0.06-0.05\times0.05\times0.05}{0.06\times0.06+0.06\times0.05+0.05\times0.05}$

$\Rightarrow \dfrac{0.06^3-0.05^3}{0.06^2+0.06\times0.05+0.05^2}$

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

$\Rightarrow \dfrac{(a-b)\left(a^2+ab+b^2\right)}{\left(a^2+ab+b^2\right)}$

$\Rightarrow a-b$

So, a = 0.06, b = 0.05

$\Rightarrow 0.06-0.05\Rightarrow 0.01$

9. (c)

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

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

a = 0.05 (Description: same as above question

b = 0.04

$\Rightarrow a-b\Rightarrow 0.05-0.04$

$\Rightarrow 0.01$

10. (c) $\dfrac{5.32\times56+5.32\times44}{(7.66)^2-(2.34)^2}$

$\Rightarrow \dfrac{5.32(56+44)}{(7.66-2.34)(7.66+2.34)}$

$\Rightarrow \dfrac{5.32(100)}{(5.32)(10)}$

$\Rightarrow \dfrac{100}{10}=10$

11. (b) $\sqrt{3}\ ,\sqrt[3]{2}\ ,\sqrt{2}\ ,\sqrt[3]{4}$

$\Rightarrow 3^{\frac{1}{2}}\ ,\ 2^{\frac{1}{3}}\ ,\ 2^{\frac{1}{2}}\ ,\ 4^{\frac{1}{3}}$

(take LCM of 3 &2)

$\Rightarrow 3^{\frac{3}{6}}\ ,\ 2^{\frac{2}{6}}\ ,\ 2^{\frac{3}{6}}\ ,\ 4^{\frac{2}{6}}$

$\Rightarrow \sqrt[6]{3^3}\ ,\ \sqrt[6]{2^2}\ ,\ \sqrt[6]{2^3}\ ,\ \sqrt[6]{4^2}$

$\Rightarrow \sqrt[6]{27}\ ,\ \sqrt[6]{4}\ ,\ \sqrt[6]{8}\ ,\ \sqrt[6]{16}\Rightarrow \mathbf{\sqrt[3]{2}}$

12. (a) $\sqrt[3]{4}\ ,\ \sqrt[4]{6}\ ,\ \sqrt[6]{15}\ ,\ \sqrt[12]{245}$

$\Rightarrow 4^{\frac{1}{3}}\ ,\ 6^{\frac{1}{4}}\ ,\ 15^{\frac{1}{6}}\ ,\ 245^{\frac{1}{12}}$

(take LCM of 3, 4, 12 & 6)

$\Rightarrow 4^{\frac{4}{12}}\ ,\ 6^{\frac{3}{12}}\ ,\ 15^{\frac{2}{12}}\ ,\ 245^{\frac{1}{12}}$

$\Rightarrow \sqrt[12]{4^4}\ ,\ \sqrt[12]{6^3}\ ,\ \sqrt[12]{15^2}\ ,\ \sqrt[12]{245}$

$\Rightarrow \sqrt[12]{256}\ ,\sqrt[12]{216}\ ,\ \sqrt[12]{225}\ ,\sqrt[12]{245}$

$\Rightarrow$ Biggest $=\sqrt[3]{4}$

13. (b) $\left[\sqrt[3]{\sqrt[6]{5^9}}\right]^4\ \left[\sqrt[3]{\sqrt[6]{5^9}}\right]^4$

$\Rightarrow \left[5^{9\times\frac{1}{6}\times\frac{1}{3}}\right]^4\left[5^{9\times\frac{1}{3}\times\frac{1}{6}}\right]^4$

$\Rightarrow \left[5^{\frac{1}{2}}\right]^4\left[5^{\frac{1}{2}}\right]^4$

$\Rightarrow 5^2\times5^2$

$\Rightarrow 5^{2+2}\Rightarrow 5^4$

14. (a) $27^{2n-1}=243^3$

$3^{3(2n-1)}=3^{5\times3}$

$3^{6n-3}=3^{15}$

$6n-3=15$

$6n=18$

$n=\dfrac{18}{6}$, $n=3$

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

$3^{x+8}=(3^3)^{2x+1}$

$3^{x+8}=3^{6x+3}$

$x+8=6x+3$

$5x=5,\quad x=1$

16. (b) $\left(\sqrt{8}-\sqrt{4}-\sqrt{2}\right)$

$\Rightarrow 2\sqrt{2}-2-\sqrt{2}$

$\Rightarrow 2\sqrt{2}-\sqrt{2}-2$

$\Rightarrow \sqrt{2}-2$

17. (c) $8^{\frac{2}{3}} \Rightarrow (2^3)^{\frac{2}{3}}$

$\Rightarrow 2^{3\times\frac{2}{3}}$

$\Rightarrow 2^2 = 4$

18. (b) $\left(16^{\frac{3}{2}}+16^{\frac{-3}{2}}\right)$

$\Rightarrow \left(16^{\frac{3}{2}}+\frac{1}{16^{\frac{3}{2}}}\right)$

$\Rightarrow \left(4^{2\times\frac{3}{2}}+\frac{1}{4^{2\times\frac{3}{2}}}\right)$

$\Rightarrow 4^3+\frac{1}{4^3} \Rightarrow \frac{4097}{64}$

19. (b) $16^{\frac{3}{4}}$

$\Rightarrow \left(2^4\right)^{\frac{3}{4}}$

$\Rightarrow 2^{4\times\frac{3}{4}} \Rightarrow 2^3 = 8$

20. (c) $(0.01024)^{\frac{1}{5}}$

$\Rightarrow (0.4^5)^{\frac{1}{5}}$

$\Rightarrow 0.4^{5\times\frac{1}{5}} = 0.4$

21. (a) $(16^{0.16}\times 2^{0.36})$

$\Rightarrow (2^4)^{0.16}\times(2)^{0.36}$

$\Rightarrow 2^{0.64}\times 2^{0.36}$

$\Rightarrow 2^{0.64+0.36}$

$\Rightarrow 2^1 \Rightarrow 2$

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

$\Rightarrow (4^3)^{\frac{-2}{3}}\times\left(\frac{1}{4}\right)^{-2}$

$\Rightarrow 4^{-2}\times\left(\frac{1}{4}\right)^{-2}$

$\Rightarrow \left(\frac{1}{4}\right)^2\times\left(\frac{1}{4}\right)^{-2} = \left(\frac{1}{4}\right)^{2-2}$

$\Rightarrow \left(\frac{1}{4}\right)^0 = 1$

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

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

$\Rightarrow \frac{\sqrt{5}-\sqrt{3}+\sqrt{10}-\sqrt{6}+\sqrt{5}+\sqrt{3}-\sqrt{10}-\sqrt{6}}{\left(\sqrt{5}\right)^2-\left(\sqrt{3}\right)^2}$

$\Rightarrow \frac{2\sqrt{5}-2\sqrt{6}}{2} \Rightarrow \frac{2\left(\sqrt{5}-\sqrt{6}\right)}{2}$

$\Rightarrow \left(\sqrt{5}-\sqrt{6}\right)$

24. (c) $\Rightarrow \left(\frac{2+\sqrt{3}}{2-\sqrt{3}}+\frac{2-\sqrt{3}}{2+\sqrt{3}}+\frac{\sqrt{3}-1}{\sqrt{3}+1}\right)$

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

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

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

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

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

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

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

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

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

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

$\Rightarrow a^2-2ab+b^2$

$\Rightarrow (a-b)^2$

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

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

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

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

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

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

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

$\Rightarrow 6^{\frac{1}{3}} \Rightarrow \sqrt[3]{6}$

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

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

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

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

$\Rightarrow (4)^{4\times0.16}\times(4)^{2\times0.18}$

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

$\Rightarrow 4$

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

$\Rightarrow \sqrt{\frac{\sqrt{36}+\sqrt{24}-\sqrt{24}-\sqrt{16}}{5+\sqrt{24}}}$

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

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

$\Rightarrow \sqrt{\frac{2\left(5-\sqrt{24}\right)}{25-24}}$

$\Rightarrow \sqrt{2\left(5-2\sqrt{6}\right)}$

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

$\Rightarrow \sqrt{2\left(\sqrt{3}-\sqrt{2}\right)^2}$

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

$\Rightarrow \sqrt{6}-2$

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) $\frac{1}{\sqrt{\left(12-\sqrt{140}\right)}} - \frac{1}{\sqrt{\left(8-\sqrt{60}\right)}} - \frac{2}{\sqrt{\left(10+\sqrt{84}\right)}}$

$\Rightarrow \frac{1}{\sqrt{12-\sqrt{4\times35}}} - \frac{1}{\sqrt{8-\sqrt{4\times15}}} - \frac{2}{\sqrt{10+\sqrt{4\times21}}}$

$\Rightarrow \frac{1}{\sqrt{12-2\sqrt{35}}} - \frac{1}{\sqrt{8-2\sqrt{15}}} - \frac{2}{\sqrt{10+2\sqrt{21}}}$

$\Rightarrow \frac{1}{\sqrt{\left(\sqrt{7}\right)^{2}+\left(\sqrt{5}\right)^{2}-2\sqrt{7}\sqrt{5}}} - \frac{1}{\sqrt{\left(\sqrt{5}\right)^{2}+\left(\sqrt{3}\right)^{2}-2\sqrt{5}\sqrt{3}}} - \frac{2}{\sqrt{\left(\sqrt{7}\right)^{2}+\left(\sqrt{3}\right)^{2}+2\sqrt{7}\sqrt{3}}}$

$\Rightarrow \frac{1}{\sqrt{\left(\sqrt{7}-\sqrt{5}\right)^{2}}} - \frac{1}{\sqrt{\left(\sqrt{5}-\sqrt{3}\right)^{2}}} - \frac{2}{\sqrt{\left(\sqrt{7}+\sqrt{3}\right)^{2}}}$

$\Rightarrow \frac{1}{\sqrt{7}-\sqrt{5}} - \frac{1}{\sqrt{5}-\sqrt{3}} - \frac{2}{\sqrt{7}+\sqrt{3}}$

Rationalizing in above equation.

$\Rightarrow \frac{1}{\sqrt{7}-\sqrt{5}} \times \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}+\sqrt{5}} - \frac{1}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}} - \frac{2}{\sqrt{7}+\sqrt{3}} \times \frac{\sqrt{7}-\sqrt{3}}{\sqrt{7}-\sqrt{3}}$

$\Rightarrow \frac{\sqrt{7}+\sqrt{5}}{2} - \frac{\left(\sqrt{5}+\sqrt{3}\right)}{2} - \frac{\left(\sqrt{7}-\sqrt{3}\right)}{2}$

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

$\Rightarrow 0$

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

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

$\Rightarrow \sqrt{\left(\sqrt{6}+\sqrt{5}\right)^{2}} - \frac{1}{\sqrt{\left(\sqrt{6}+\sqrt{5}\right)^{2}}}$

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

Rationalising above equation

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

$\Rightarrow \sqrt{6}+\sqrt{5} - \left(\sqrt{6}-\sqrt{5}\right)$

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

$\Rightarrow 2\sqrt{5}$

35. (c) $\frac{(1.5)^{3}+(4.7)^{3}+(3.8)^{3}-3\times1.5\times4.7\times3.8}{(1.5)^{2}+(4.7)^{2}+(3.8)^{2}-1.5\times4.7-4.7\times3.8-3.8\times1.5}$

$\Rightarrow \frac{(1.5+4.7+3.8)(1.5^{2}+4.7^{2}+3.8^{2}-1.5\times4.7-4.7\times3.8-3.8\times1.5)}{(1.5^{2}+4.7^{2}+3.8^{2}-1.5\times4.7-4.7\times3.8-3.8\times1.5)}$

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

$\Rightarrow 1.5 + 4.7 + 3.8 \Rightarrow 10.0$

$\Rightarrow 10$

36. (d) $\frac{(6.25)^{\frac{1}{2}}\times(0.0144)^{\frac{1}{2}}+1}{(0.027)^{\frac{1}{3}}\times(81)^{\frac{1}{4}}}$

$\Rightarrow \frac{(2.5\times0.12)+1}{0.3\times3} \Rightarrow \frac{0.3+1}{0.9} \Rightarrow \frac{1.3}{0.9}$

$\Rightarrow 1.44..... \Rightarrow 1.\overline{4}$

37. (c)

$\frac{0.41\times0.41\times0.41+0.69\times0.69\times0.69}{0.41\times0.41-0.41\times0.69+0.69\times0.69}$

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

$\because$ $\left[a^3+b^3=(a+b)(a^2+b^2-ab)\right]$

$\Rightarrow$ 0.41 +0.69 = 1.10

38. (c)

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

↓ ↓ ↓ ↓

0.25 0.7 0.2 0.23

↓

least

39. (b) $3^{10} \times 27^2 = 9^2 \times 3^n$

$3^{10} \times (3^3)^2 = (3^2)^2 \times 3^n$

$3^{10+6} = 3^{4+n}$

So,

10 + 6 = 4 + n

n = 12

40. (c)

$(2.89)^{0.5}$ → $(2.89)^{5/10}$ → $\sqrt{2.89}$ → 1.7

$2-(0.5)^2$ → $2-0.25$ → 1.75

$\frac{1+0.5}{1-1/2}$ → $\frac{1+0.5}{0.5}$ → 1+1 → 2

$\sqrt{3}$ → 1.732

↑ **Greatest**

41. (a)

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

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

$\sqrt[4]{5}$ → $5^{1/4}$ → $5^{3/12}$ → $\sqrt[12]{5^3}$ → $\sqrt[12]{125}$

$\sqrt[3]{2}$ → $2^{1/3}$ → $2^{4/12}$ → $\sqrt[12]{2^4}$ → $\sqrt[12]{16}$

↑ Greatest

42 (d) $125^{2/3} \times 625^{-1/4} = 5^x$

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

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

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

$x = 2 - 1 = x = 1$

43. (a) $\dfrac{(243)^{0.13} \times (243)^{0.07}}{7^{0.25} \times 49^{0.075} \times 343^{0.2}}$

$\Rightarrow \dfrac{243^{0.13+0.07}}{7^{0.25} \times 7^{2\times075} \times 7^{3\times0.2}}$

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

44. (b) $\sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{7 + 4\sqrt{3}}}}$

$\Rightarrow \sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{4 + 3 + 2\times2\times\sqrt{3}}}}$

$\Rightarrow \sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{(2+\sqrt{3})^2}}}$

$\Rightarrow \sqrt{-\sqrt{3} + \sqrt{3 + 8(2+\sqrt{3})}}$

$\Rightarrow \sqrt{-\sqrt{3} + \sqrt{3 + 16 + 8\sqrt{3}}}$

$\Rightarrow \sqrt{-\sqrt{3} + \sqrt{(\sqrt{3})^2 + (4)^2 + 2\times4\times\sqrt{3}}}$

$\Rightarrow \sqrt{-\sqrt{3} + \sqrt{(4+\sqrt{3})^2}}$

$\Rightarrow \sqrt{-\sqrt{3} + 4 + \sqrt{3}} \Rightarrow \sqrt{4} = 2$

45. (b) $\sqrt{\sqrt[3]{0.004096}}$

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

$\Rightarrow \sqrt{0.4\times0.4}$

$\Rightarrow 0.4$

46. (b) $\dfrac{3\sqrt{12}}{2\sqrt{28}} \div \dfrac{2\sqrt{21}}{\sqrt{98}}$

$\Rightarrow \dfrac{3\times2\times\sqrt{3}}{2\times2\times\sqrt{7}} \div \dfrac{2\times\sqrt{3}\times\sqrt{7}}{7\sqrt{2}}$

$\Rightarrow \dfrac{3\times2\times\sqrt{3}}{2\times2\times\sqrt{7}} \times \dfrac{7\times\sqrt{2}}{2\times\sqrt{3}\times\sqrt{7}} \Rightarrow \dfrac{3\sqrt{2}}{4}$

$\Rightarrow \dfrac{3\times1.414}{4} = 1.0605$

$\Rightarrow$ Approx = 1.0606

47. (a) $\dfrac{2.3\times2.3\times2.3-1}{2.3\times2.3+2.3+1}$

$a = 2.3$

$b = 1$

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

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

$\Rightarrow 2.3 - 1 = 1.3$

48. (b)

$(2.89)^{0.5} \rightarrow (2.89)^{1/2} \rightarrow \sqrt{2.89} \rightarrow 1.7$

$2-(0.5)^2 \rightarrow 2 - 0.25 \rightarrow 1.75$

$\sqrt{3} \rightarrow 1.732$

$\sqrt[3]{0.008} \rightarrow 0.2$

Ascending order:

$0.2 < 1.7 < 1.732 < 1.75$

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

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

$= \sqrt[30]{32768}$

$\sqrt[3]{3} \rightarrow 3^{1/3} \rightarrow 3^{10/30} = \sqrt[30]{3^{10}}$

$= \sqrt[30]{59049}$

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

$= \sqrt[30]{7776}$

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

$= \sqrt[30]{15625}$

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

50. (a) $\sqrt{2} = 1.414$

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

$\Rightarrow 2\sqrt{2} + 2\times4\sqrt{2} - 3\times8\sqrt{2} + 4\times5\sqrt{2}$

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

$\Rightarrow 6\sqrt{2}$

$\Rightarrow 6 \times 1.414 \Rightarrow 8.484$

51. (a) $\sqrt{\dfrac{5}{3}} \Rightarrow \sqrt{\dfrac{5\times3}{3\times3}} = \sqrt{\dfrac{15}{9}} = \dfrac{\sqrt{15}}{3}$

$\Rightarrow \dfrac{3.88}{3} = 1.29\overline{3}$

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

$\therefore$ Required rationalising factor is $\sqrt{3}$

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

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

$x^2 = 2 + x$

$x^2 - x - 2 = 0$

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

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

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

$x = 2$

Shortcut Method

When the question is in this form

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

Then factor the $\overset{x}{\underset{n1 \quad n2}{}}$ n1 > n2

$n1 \; n2$ (mi.diff.)

So n1 is answer

$\sqrt{2 + \sqrt{2 + \sqrt{2}}}$

② × 1

54. (a) $2 + \sqrt{0.09} - \sqrt[3]{0.008} - 75\%$ of 2.80

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

$\Rightarrow 2 + 0.3 - 0.2 - 2.10$

$\Rightarrow 2.3 - 2.3 = 0$

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

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

$x = \sqrt[3]{3.5}$

$y = \sqrt[3]{2.5}$

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

$\Rightarrow x^3 + y^3$

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

$\Rightarrow 3.5 + 2.5 = 6$

56. (d) $\left(3 + 2\sqrt{2}\right)^{-3} + \left(3 - 2\sqrt{2}\right)^{-3}$

$\Rightarrow \left(\dfrac{1}{3+2\sqrt{2}}\right)^3 + \left(\dfrac{1}{3-2\sqrt{2}}\right)^3$

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

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

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

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

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

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

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

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

$\Rightarrow (6)(33)$

$\Rightarrow 198$

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

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

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

$\Rightarrow \frac{\sqrt{15}-\sqrt{10}}{3-2} - \frac{3\sqrt{3}\left(\sqrt{5}-\sqrt{2}\right)}{5-2}$

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

$\Rightarrow \sqrt{15}-\sqrt{10}-\left(\sqrt{15}-\sqrt{6}\right)+\sqrt{10}-\sqrt{6}$

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

$\Rightarrow 0$

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

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

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

Similarly: $\frac{1}{\sqrt{4.25}+\sqrt{3.25}}$

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

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

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

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

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

$\Rightarrow$ Now add all them

$\Rightarrow \sqrt{3.25}-\sqrt{2.25}+\sqrt{4.25}-\sqrt{3.25}$

$+\sqrt{5.25}-\sqrt{4.25}+\sqrt{6.25}-\sqrt{5.25}$

$\Rightarrow \sqrt{6.25}-\sqrt{2.25} \Rightarrow 2.5-1.5=1$

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

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

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

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

$\Rightarrow \frac{(10.3+1)\left((10.3)^2+(1)^2-10.3\times1\right)}{(10.3)^2-10.3+1^2}$

$\Rightarrow 10.3+1 \Rightarrow 11.3$

61. (c) $\frac{1.49\times14.9-0.51\times5.1}{14.9-5.1}$

$\Rightarrow \frac{\frac{149}{100}\times\frac{149}{10}-\frac{051}{100}\times\frac{51}{10}}{\frac{149}{10}-\frac{51}{10}}$

$\Rightarrow \frac{\frac{149^2}{1000}-\frac{51^2}{1000}}{\left(\frac{\quad}{\quad}\right)}$

$\Rightarrow \frac{\frac{1}{1000}\left(149^2-51^2\right)}{\frac{1}{10}(149-51)}$

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

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

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

$\Rightarrow \left(\frac{1}{0.04}\right)^{\frac{15}{10}} \Rightarrow \left(\frac{1}{(0.2)^2}\right)^{3/2}$

$\Rightarrow \frac{1}{(0.2)^{2\times3/2}}$

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

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

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

$\Rightarrow a = 0.96$

$\Rightarrow b = 0.1$

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

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

$\Rightarrow a-b$

$\Rightarrow 0.96-0.1=0.86$

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

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

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

$\Rightarrow 4-0.2=3.8$

65. (c) $4+\sqrt{7}$

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

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

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

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

$\Rightarrow \frac{2}{\sqrt{7}+\sqrt{5}}\times\frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}-\sqrt{5}} +$

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

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

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

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

$\Rightarrow \sqrt{7}-\sqrt{5}+\sqrt{12}+\sqrt{5}-\sqrt{12}-\sqrt{7}$

$\Rightarrow 0$

67. (a) $\left(\frac{1}{2}\right)^{1/2} \Rightarrow \sqrt{\frac{1}{2}} \Rightarrow \frac{1}{\sqrt{2}}$

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

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

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

$\Rightarrow \sqrt{4}-\sqrt{3}$

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

$\Rightarrow \sqrt{4}-\sqrt{3}+\sqrt{5}-\sqrt{4}+\sqrt{6}-\sqrt{5}+\sqrt{7}-$

$\sqrt{6}+\sqrt{8}-\sqrt{7}+\sqrt{9}-\sqrt{8}$

$\Rightarrow \sqrt{9}-\sqrt{3}$

$\Rightarrow 3-\sqrt{3}$

69. (b) $(16)^{0.16} \times (16)^{0.04} \times (2)^{0.2}$

$\Rightarrow 16^{0.16+0.04} \times 2^{0.2}$

$\Rightarrow (2^4)^{0.20} \times 2^{0.2}$

$\Rightarrow 2^{0.8} \times 2^{0.2}$

$\Rightarrow 2^{0.8+0.2}$

$\Rightarrow 2^1 = 2$

70. (d) $\frac{1}{\sqrt{100}-\sqrt{99}} \times \frac{\sqrt{100}+\sqrt{99}}{\sqrt{100}+\sqrt{99}}$

$\Rightarrow \frac{\sqrt{100}+\sqrt{99}}{1} \Rightarrow \sqrt{100}+\sqrt{99}$

Similarly

$\Rightarrow \frac{1}{\sqrt{99}-\sqrt{98}} \Rightarrow \sqrt{99}+\sqrt{98}$

$\Rightarrow \frac{1}{\sqrt{98}-\sqrt{97}} \Rightarrow \sqrt{98}+\sqrt{97}$ ..and

so on

Now : expression:

$\Rightarrow \sqrt{100}+\sqrt{99}-\sqrt{99}-\sqrt{98}+\sqrt{98}+\sqrt{97}$

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

$\Rightarrow \sqrt{100}+1 \Rightarrow 10+1=11$

71. (c) $\left[\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}}+\frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}}\right]$

$\Rightarrow \frac{1}{\left(\sqrt{2}+\sqrt{3}\right)-\left(\sqrt{5}\right)} \times \frac{\left(\sqrt{2}+\sqrt{3}\right)+\left(\sqrt{5}\right)}{\left(\sqrt{2}+\sqrt{3}\right)+\left(\sqrt{5}\right)}$

$\sqrt{2}+\sqrt{3}+\sqrt{5} \qquad \sqrt{2}+\sqrt{3}+\sqrt{5}$

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

Similarly

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

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

Now put the value in question

$\Rightarrow \frac{\left(\sqrt{2}+\sqrt{3}+\sqrt{5}\right)}{\left(2\sqrt{6}\right)}-\frac{\left(\sqrt{2}-\sqrt{3}+\sqrt{5}\right)}{\left(2\sqrt{6}\right)}$

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

$\Rightarrow \frac{2\sqrt{3}}{2\sqrt{6}} \Rightarrow \frac{1}{\sqrt{2}}$

72. (b) $\sqrt[3]{2} \times \sqrt{2} \times \sqrt[3]{3} \times \sqrt{3}$

$\Rightarrow 2^{1/3} \times 2^{1/2} \times 3^{1/3} \times 3^{1/2}$

$\Rightarrow 2^{5/6} \times 3^{5/6} \Rightarrow 6^{5/6}$

73. (a) $\left\{(-2)^{(-2)}\right\}^{-2}$

$\Rightarrow \frac{1}{\left\{(-2)^{(-2)}\right\}^{2}} \Rightarrow \frac{1}{(-2)^{-4}}$

$\Rightarrow (-2)^4 = 16$

74. (d) 0.796 = a, 0.204 = b

According to question

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

$\Rightarrow$ a + b $\Rightarrow$ 0.796 + 0.204

$\Rightarrow$ 1.000

75. (a) $\frac{(2.3)^3+0.027}{(2.3)^2-0.69+0.09}$

$\Rightarrow \frac{(2.3)^3+(0.3)^3}{(2.3)^2-0.69+(0.3)^2}$

$\Rightarrow$ a = 2.3, b = 0.3

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

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

$\Rightarrow$ a + b

$\Rightarrow$ 2.3 + 0.3

$\Rightarrow$ 2.60

76. (d) a = 5.71, b = 2.79

$\Rightarrow \frac{a\times a\times a-b\times b\times b}{a\times a+a\times b+b\times b}$

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

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

$\Rightarrow$ (a –b)

$\Rightarrow$ 5.71 – 2.79

$\Rightarrow$ 2.92

77. (c) $\frac{(1.5)^3+(4.7)^3+(3.8)^3}{(1.5)^2+(4.7)^2+(3.8)^2-1.5\times 4.7} \ldots$

$\frac{-3\times 1.5\times 4.7\times 3.8}{-4.7\times 3.8-3.8\times 1.5}$

$\Rightarrow$ a = 1.5 $\Rightarrow$ b = 4.7

$\Rightarrow$ c = 3.8

$\Rightarrow \frac{a^3+b^3+c^3-3abc}{a^2+b^2+c^2-ab-bc-ca}$

$\Rightarrow$

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

$\Rightarrow$ a + b + c

$\Rightarrow$ 1.5 + 4.7 + 3.8 = 10.0 $\Rightarrow$ 10

78. (a) a = 0.73, b = 0.27

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

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

$\Rightarrow$ a + b $\Rightarrow$ 0.73 + 0.27 = 1

79. (c) $\left[3-4\left(3-4\right)^{-1}\right]^{-1}$

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

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

$\Rightarrow [3+4]^{-1} \Rightarrow 7^{-1} = \frac{1}{7}$

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

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

$\Rightarrow (8^2)^{2n} - (6^2)^{2n}$

$\Rightarrow 64^{2n} - 36^{2n}$ (n = 1)

$\Rightarrow 64^2 - 36^2$

$\Rightarrow (64 + 36)(64 - 36)$

$\Rightarrow 100\times28, \Rightarrow 100$ Ans

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

$= 8 + 5 + 2\sqrt{40} = 13 + 2\sqrt{40}$

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

$\Rightarrow 13+2\sqrt{42}$

$\Rightarrow \left(\sqrt{10}+\sqrt{3}\right) \Rightarrow \left(\sqrt{10}+\sqrt{3}\right)^2$

$\Rightarrow 10+3+2\sqrt{30} \Rightarrow 13+2\sqrt{30}$

$\Rightarrow \sqrt{11}+\sqrt{2} \Rightarrow \left(\sqrt{11}+\sqrt{2}\right)^2$

$\Rightarrow 11+2+2\sqrt{22} \Rightarrow 13+2\sqrt{22}$,

$\sqrt{11}+\sqrt{2}$

82. (b)

$\sqrt{2} = 2^{\frac{1}{2}} \rightarrow 2^{\frac{6}{12}} \rightarrow 2^{\frac{6}{12}} \rightarrow \sqrt[12]{2^6} \rightarrow \sqrt[12]{64}$

$\Rightarrow \sqrt[3]{3} = 3^{\frac{1}{3}} \rightarrow 3^{\frac{4}{12}} \rightarrow \sqrt[12]{3^4} \rightarrow \sqrt[12]{\mathbf{81}}$

$\Rightarrow \sqrt[4]{4} = 4^{\frac{1}{4}} \rightarrow 4^{\frac{3}{12}} \rightarrow \sqrt[12]{4^3} \rightarrow \sqrt[12]{64}$

$\Rightarrow \sqrt[6]{6} = 6^{\frac{1}{6}} \rightarrow 6^{\frac{2}{12}} \rightarrow \sqrt[12]{6^2} \rightarrow \sqrt[12]{36}$

83. (d) $\left(\sqrt{19}-\sqrt{17}\right) \Rightarrow \left(\sqrt{19}-\sqrt{17}\right) \times$

$\frac{\left(\sqrt{19}+\sqrt{17}\right)}{\sqrt{19}+\sqrt{17}} \Rightarrow \frac{19-17}{\sqrt{19}+\sqrt{17}} = \frac{2}{\sqrt{19}+\sqrt{17}}$

Similarly:- $\left(\sqrt{13}-\sqrt{11}\right) \Rightarrow \frac{2}{\sqrt{13}+\sqrt{11}}$

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

Largest (Because Same Numerator is divided by Smallest denominator)

84. (c)

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

85. (b) $(d^{s+t} \div d^s) \div d^t$

$\Rightarrow \left(\frac{d^{s+t}}{d^s}\right) \div d^t$

$= (d^{s+t-s}) \div d^t = (d^t) \div d^t$

$= \frac{d^t}{d^t} = d^{t-t} = d^o = 1$

86. (a) $x = \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}} \Rightarrow \frac{\left(\sqrt{5}+\sqrt{3}\right)^2}{2}$

$\Rightarrow$ Similarly

$y = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} \Rightarrow \frac{\left(\sqrt{5}-\sqrt{3}\right)^2}{2}$

$\Rightarrow x + y$

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

$\Rightarrow \frac{16}{2} = 8$

87. (c) $\sqrt{3} = 1.732 \Rightarrow \frac{173}{100}$

88. (d) $0.75 = a, \quad 0.25 = b$

$\Rightarrow a \times a - 2 \times a \times b + b \times b$

$\Rightarrow a^2 - 2ab + b^2 \Rightarrow (a-b)^2$

$\Rightarrow (0.75 - 0.25)^2$

$\Rightarrow (0.50)^2 = 0.2500$

89. (a)

$\sqrt{4}$	$\sqrt[3]{4}$	$\sqrt[4]{6}$	$\sqrt[6]{8}$
↓	↓	↓	↓
$4^{1/2}$	$4^{1/3}$	$6^{1/4}$	$8^{1/6}$
↓	↓	↓	↓
$4^{6/12}$	$4^{4/12}$	$6^{3/12}$	$8^{2/12}$
↓	↓	↓	↓
$\sqrt[12]{4^6}$	$\sqrt[12]{4^4}$	$\sqrt[12]{6^3}$	$\sqrt[12]{8^2}$
↓	↓	↓	↓
$\boxed{\sqrt[12]{4096}}$	$\sqrt[12]{256}$	$\sqrt[12]{216}$	$\sqrt[12]{64}$
↑ Largest			
$\boxed{\text{Ans } \sqrt{4}}$			

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

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

$\Rightarrow \frac{12\left(3+\sqrt{5}-2\sqrt{2}\right)}{\left(3+\sqrt{5}\right)^2-\left(2\sqrt{2}\right)^2}$

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

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

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

$\Rightarrow \frac{2\left(3\sqrt{5}+5-2\sqrt{10}-3-\sqrt{5}+2\sqrt{2}\right)}{5-1}$

$\Rightarrow \frac{2\left(2\sqrt{5}+2\sqrt{2}-2\sqrt{10}+2\right)}{4}$

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

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

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

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

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

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

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

$= 3$

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

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

$\Rightarrow \sqrt{\left(\sqrt{5}-\sqrt{3}\right)^2} = \boxed{\sqrt{5}-\sqrt{3}}$

93. (d)

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

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

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

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

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

$$\Rightarrow [8-8] = 0$$

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

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

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

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

$$\Rightarrow \sqrt{12}-2\sqrt{3} \Rightarrow 2\sqrt{3}-2\sqrt{3}=0$$

95. (b)

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

Formula:

$$\frac{1}{\text{Difference of denominator value}}\left[\frac{1}{\text{first value}}-\frac{1}{\text{Last value}}\right]$$

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

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

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

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

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

$$\Rightarrow \frac{a^2+b^2+ab}{(a-b)(a^2+b^2+ab)} \Rightarrow \frac{1}{a-b}$$

$$\Rightarrow \frac{1}{137-133} \Rightarrow \frac{1}{4}$$

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

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

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

$$\Rightarrow (a-b) \Rightarrow 2.75-2.25$$

$$\Rightarrow 0.50$$

98. (b)

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

$$\Rightarrow \sqrt{5}-\sqrt{3} \Rightarrow \boxed{\frac{2}{\sqrt{5}+\sqrt{3}}} \text{ Largest}$$

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

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

$$\boxed{\sqrt{5}-\sqrt{3}}$$

99.(a)

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

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

100. (c)

$$2\sqrt{3} \quad 2\sqrt[4]{5} \quad \sqrt{8} \quad 3\sqrt{2}$$
$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$
$$(4\times 3)^{1/2} \quad 4\sqrt{(5\times 16)} \quad \sqrt{8} \quad \sqrt{18}$$
$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$
$$12^{1/2} \quad 80^{1/4} \quad 8^{1/2} \quad 18^{1/2}$$
$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$
$$12^{2/4} \quad 80^{1/4} \quad 8^{2/4} \quad 18^{2/4}$$
$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$
$$\sqrt[4]{144} \quad \sqrt[4]{80} \quad \boxed{\sqrt[4]{64}} \quad \sqrt[4]{324}$$
smallest

$\sqrt{8}$ is answer

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

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

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

$$\Rightarrow \frac{3+\sqrt{6}}{\sqrt{3}+\sqrt{2}} \Rightarrow \frac{\sqrt{3}\left(\sqrt{3}+\sqrt{2}\right)}{\sqrt{3}+\sqrt{2}}$$

$$\Rightarrow \sqrt{3} = 1.732$$

102. (c)

$$\frac{1}{\sqrt{5}+\sqrt{3}}\times\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}}=\frac{\sqrt{5}-\sqrt{3}}{5-3} \Rightarrow \frac{2.236-1.732}{2}$$

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

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

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

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

$$= 9\sqrt[3]{4}-3\sqrt[3]{4} = 6\sqrt[3]{4}$$

104. (b) $\sqrt{12+\sqrt{12+\sqrt{12+}}}.....$

④ × 3

105. (a) $a=\frac{\sqrt{3}}{2} \Rightarrow a+1=\frac{\sqrt{3}}{2}+1$

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

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

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

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

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

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

put values :

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

$$\Rightarrow \sqrt{3}$$

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

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

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

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

Put value in expression

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

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

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

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

$\Rightarrow \frac{1}{\sqrt{0.000064}} \Rightarrow \frac{1}{.008} \Rightarrow \frac{1000}{8}$

$\Rightarrow 125$

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

$\Rightarrow \sqrt[3]{\frac{1372 \times 1458}{343}} \Rightarrow \sqrt[3]{5832}$

$\Rightarrow \sqrt[3]{18 \times 18 \times 18} \Rightarrow 18$

109. (c) $\left[\frac{2}{\sqrt{5}+\sqrt{3}} - \frac{3}{\sqrt{6}-\sqrt{3}} + \frac{1}{\sqrt{6}+\sqrt{5}}\right]$

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

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

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

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

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

$\Rightarrow -2\sqrt{3}$

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

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

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

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

$\Rightarrow \left(3+2+2\sqrt{6}\right) - \left(3+2-2\sqrt{6}\right)$

$\Rightarrow 4\sqrt{6}$

111. (a) $\frac{1}{\sqrt{9}-\sqrt{8}} \times \frac{\sqrt{9}+\sqrt{8}}{\sqrt{9}+\sqrt{8}} = \frac{\sqrt{9}+\sqrt{8}}{9-8}$

$\Rightarrow \sqrt{9}+\sqrt{8}$

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

$\Rightarrow \left(\sqrt{9}+\sqrt{8}\right) - \left(\sqrt{8}+\sqrt{7}\right) + \left(\sqrt{7}+\sqrt{6}\right) -$

$\left(\sqrt{6}+\sqrt{5}\right) + \left(\sqrt{5}+\sqrt{4}\right)$

$\Rightarrow \sqrt{9}+\sqrt{8}-\sqrt{8}-\sqrt{7}+\sqrt{7}+\sqrt{6}-$

$\sqrt{6}-\sqrt{5}+\sqrt{5}+\sqrt{4}$

$\Rightarrow \sqrt{9}+\sqrt{4}$

$\Rightarrow 3+2=5$

112. (c) $\left(\sqrt{2}+\sqrt{7-2\sqrt{10}}\right)$

$\Rightarrow \sqrt{2}+\sqrt{(5)^2+\left(\sqrt{2}\right)^2-2\sqrt{5}\sqrt{2}}$

$\Rightarrow \sqrt{2}+\sqrt{\left(\sqrt{5}-\sqrt{2}\right)^2}$

$\Rightarrow \sqrt{2}+\sqrt{5}-\sqrt{2} \Rightarrow \sqrt{5}$

113. (d) $(2^3)^2 = 4^x$

$(8)^2 = 4^x$

$64 = 4^x$

$(4)^3 = 4^x$

On compairing both sides

$x = 3$

So, Value of $3^x = (3)^3 = 27$

114. (a) a = 5.624, b = 4.376

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

$\Rightarrow (a+b)$

$\Rightarrow 5.624 + 4.376 \Rightarrow 10$

115. (d) $\frac{(998)^2-(997)^2-45}{(98)^2-(97)^2}$

$\Rightarrow \frac{\left[(998)^2-(997)^2\right]-45}{(98)^2-(97)^2}$

$\Rightarrow \frac{(1995)-45}{195} \Rightarrow \frac{1950}{195} = 10$

116. (b) $\frac{3\sqrt{5}}{2\sqrt{5}-0.48}$

$\Rightarrow \frac{3 \times 2.24}{2 \times 2.24 - 0.48}$ $(\sqrt{5} = 2.24)$

$\Rightarrow \frac{6.72}{4.48-0.48} \Rightarrow \frac{6.72}{4} \Rightarrow 1.68$

117. (a) $\frac{1}{\sqrt{2}+1}$

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

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

$\Rightarrow \frac{\sqrt{2}-1}{2-1} = \left(\sqrt{2}-1\right)$

$\Rightarrow 1.414 - 1$

$\Rightarrow 0.414$

118. (b) $\sqrt{3} = 1.732$

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

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

$\Rightarrow 4+3+4\sqrt{3}$

$\Rightarrow 7 + 4 \times 1.732$

$\Rightarrow 7 + 6.928 \Rightarrow 13.928$

119. (a) $x = 1+\sqrt{2}+\sqrt{3}$

$\Rightarrow \quad x+\frac{1}{x-1}$

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

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

$\Rightarrow \quad 1+2\sqrt{3}$

120. (c) Shortcut method

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

Let x = –1

$\Rightarrow -1+\frac{1}{-1}=-2$ (matched, so x = –1)

Put n = 1

$x^{2n+1}+\frac{1}{x^{2n+1}}$

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

121. (d) $m^n = 121 = 11^2$

$\Rightarrow m = 11$

$\Rightarrow n = 2$

$\Rightarrow (m-1)^{n+1}$

$\Rightarrow (11-1)^{2+1} \Rightarrow 10^3 \Rightarrow 1000$

122. (a) $\frac{1}{3-\sqrt{8}}$

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

$\Rightarrow 3+\sqrt{8}$

Similarly,

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

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

$\Rightarrow \frac{1}{\sqrt{6}-\sqrt{5}} =\sqrt{6}+\sqrt{5}$

$\Rightarrow \frac{1}{\sqrt{5}-2} =\sqrt{5}+2$

Put value in question

$\Rightarrow (3+\sqrt{8})-(\sqrt{8}+\sqrt{7})+(\sqrt{7}+\sqrt{6})$

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

$\Rightarrow 3+\sqrt{8}-\sqrt{8}-\sqrt{7}+\sqrt{7}+\sqrt{6}-\sqrt{6}-\sqrt{5}+\sqrt{5}+2$

$\Rightarrow 3+2=5$

123. (d) $256^{0.16}\times4^{0.36}$

$\Rightarrow 4^{4\times0.16}\times4^{0.36}$

$\Rightarrow 4^{0.64+0.36} \Rightarrow 4^1 \Rightarrow 4$

124. (a) Let 0.337 = a and 0.126 = b

Now, expression is

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

125. (a) $16\sqrt{\frac{3}{4}}-9\sqrt{\frac{4}{3}}$

$\Rightarrow 16\sqrt{\frac{3\times4}{4\times4}}-9\sqrt{\frac{4\times3}{3\times3}}$

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

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

$\Rightarrow \sqrt{12} \Rightarrow 3.46$

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

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

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

$81^{x-y}=3$

$3^{4x-4y}=3^1$

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

From equation (i) and (ii)

$4x-4y=1$

$4x+4y=16$

$8x=17$

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

127. (a)

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

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

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

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

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

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

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

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

129. (a) $\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}+\frac{\sqrt{2}+1}{\sqrt{2}-1}+\frac{\sqrt{3}-1}{\sqrt{3}+1}+\frac{\sqrt{2}-1}{\sqrt{2}+1}\right)$

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

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

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

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

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

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

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

$\Rightarrow 10$

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

$\left(\sqrt[4]{(3x+1)}\right)^4=2^4$

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

$3x=15, \quad x=5$

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

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

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

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

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

$\Rightarrow \frac{24}{2}=12$

132. (d)

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

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

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

$$\Rightarrow \frac{2\times\left(\sqrt{6}-2\right)}{6-4}+\frac{\left(\sqrt{7}-\sqrt{6}\right)}{7-6}+\frac{\sqrt{8}+\sqrt{7}}{8-7}$$

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

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

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

$$\Rightarrow 2\sqrt{7}$$

133. (a)

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

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

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

$$\Rightarrow \frac{1}{16}$$

134. (b) $\dfrac{256\times256-144\times144}{112}$

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

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

135. (d) a = 8.7, b = 1.3

$\Rightarrow (a \times a + 2 \times a \times b + b \times b)$

$\Rightarrow (a^2 + 2ab + b^2)$

$\Rightarrow (a + b)^2$

$\Rightarrow (8.7 + 1.3)^2$

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

136. (a) a = 3.06, b = 1.98

$$\Rightarrow \frac{a^3-b^3}{a^2+a\times b+b^2}$$

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

$\Rightarrow 3.06 - 1.98 = 1.08$

137. (c) a = 3.25, b = 1.75

$$\Rightarrow \frac{a\times a+b\times b-2\times a\times b}{a\times a-b\times b}$$

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

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

$$\Rightarrow \frac{3.25-1.75}{3.25+1.75}$$

$$\Rightarrow \frac{1.50}{5.00} \Rightarrow \frac{3}{10} \Rightarrow 0.3$$

138. (b) a = 0.08, b = 0.02

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

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

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

$\Rightarrow a + b$

$\Rightarrow 0.08 + 0.02 \Rightarrow 0.10$

139. (b) $2^{60} \rightarrow (2^5)^{12} \rightarrow (32)^{12}$

$\Rightarrow 3^{48} \rightarrow (3^4)^{12} \rightarrow$ **$(81)^{12}$**

$\Rightarrow 4^{36} \rightarrow (4^3)^{12} \rightarrow (64)^{12}$

$\Rightarrow 5^{24} \rightarrow (5^2)^{12} \rightarrow (25)^{12}$

$\Rightarrow$ **3^{48} Greatest**

140. (d)

$\sqrt{2}$	$\sqrt[3]{3}$	$\sqrt[4]{5}$	$\sqrt[6]{6}$
$2^{1/2}$	$3^{1/3}$	$5^{1/4}$	$6^{1/6}$
$2^{6/12}$	$3^{4/12}$	$5^{3/12}$	$6^{2/12}$
$\sqrt[12]{2^6}$	$\sqrt[12]{3^4}$	$\sqrt[12]{5^3}$	$\sqrt[12]{6^2}$
$\sqrt[12]{64}$	$\sqrt[12]{81}$	$\sqrt[12]{125}$	$\sqrt[12]{36}$
		↑ Greatest	

$\Rightarrow \sqrt[4]{5}$

141. (d)

0.9	$(0.9)^2$	$\sqrt{0.9}$	$0.\overline{9}$
↓	.81	0.95	$\frac{9}{9}$
0.9	.81	0.95	1
			↑ (largest)

$\Rightarrow 0.\overline{9}$

142. (c) $3^{x+3} \times 9^{2x-5} = 3^{3x+7}$

$3^{x+3} \times 3^{2(2x-5)} = 3^{3x+7}$

$x + 3 + 4x - 10 = 3x + 7$

($\because$ Base is equal)

$5x - 3x = 14$

$2x = 14$

$x = 7$

143. (b) $\sqrt{3\sqrt{3\sqrt{3}}}$ .....

Shortcut method

$\Rightarrow$ When the question is in form

$\Rightarrow \sqrt{n\sqrt{n\sqrt{n}}}.....\infty$

$\Rightarrow$ So n is answer

$\Rightarrow 3$

144. (c) shortcut method

Take out option and try

Let number is $\sqrt{6}$

$$\Rightarrow \sqrt{6}\left(\sqrt{3}+\sqrt{2}\right)=\sqrt{12}+\sqrt{18}$$

$$\Rightarrow \sqrt{18}+\sqrt{12}=\sqrt{12}+\sqrt{18}$$

Matched

So this is answer

145. (a) $\dfrac{2+\sqrt{3}}{2-\sqrt{3}}+\dfrac{2-\sqrt{3}}{2+\sqrt{3}}+\dfrac{\sqrt{3}+1}{\sqrt{3}-1}$

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

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

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

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

$$\Rightarrow 7+7+2+\sqrt{3}$$

$$\Rightarrow 16+\sqrt{3}$$

146. (b) $\sqrt{14+6\sqrt{5}}$

$$\Rightarrow \sqrt{(3)^2+\left(\sqrt{5}\right)^2+2\times3\times\sqrt{5}}$$

$$\Rightarrow \sqrt{\left(3+\sqrt{5}\right)^2}$$

$$\Rightarrow 3+\sqrt{5}$$

147.(b) $\frac{3\sqrt{2}}{\sqrt{3}+\sqrt{6}} - \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}} + \frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}}$

(rationalisation)

$\Rightarrow \frac{3\sqrt{2}}{\sqrt{3}+\sqrt{6}} \times \frac{\sqrt{6}-\sqrt{3}}{\sqrt{6}-\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}} \times \frac{\sqrt{6}-\sqrt{2}}{\sqrt{6}-\sqrt{2}}$

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

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

$\frac{\sqrt{6}\left(\sqrt{3}-\sqrt{2}\right)}{3-2}$

$\Rightarrow \sqrt{12} - \sqrt{6} - \left(\sqrt{18} - \sqrt{6}\right) + \sqrt{18} - \sqrt{12}$

$\Rightarrow \sqrt{12} - \sqrt{6} - \sqrt{18} + \sqrt{6} + \sqrt{18} - \sqrt{12} = 0$

148. (b) $\frac{1}{\sqrt{2}+1} = \frac{1}{\sqrt{2}+1} \times \frac{\sqrt{2}-1}{\sqrt{2}-1}$

$= \frac{\left(\sqrt{2}-1\right)}{2-1} = \sqrt{2}-1$

Similarly

$\Rightarrow \frac{1}{\sqrt{3}+\sqrt{2}} = \sqrt{3}-\sqrt{2}$ and so on.

Now put value

$\Rightarrow \sqrt{2}-1+\sqrt{3}-\sqrt{2}+\sqrt{4}-\sqrt{3} \cdots\cdots$

$+\sqrt{100}-\sqrt{99}$

$\Rightarrow \sqrt{100}-1 \Rightarrow 10-1=9$

149. (b) Let P = 0.05

then , $\frac{P}{10} = 0.005$

Let 0.41 = q

$\therefore 0.041 = \frac{q}{10}$

and 0.073 = r

$\therefore 0.0073 = \frac{r}{10}$

According to question

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

$\Rightarrow \frac{\left(P^2+q^2+r^2\right)}{\frac{1}{100}\left(P^2+q^2+r^2\right)} \Rightarrow 100$

150. (d) According to the question

$\Rightarrow 3^{x+y} = 81$ and $81^{x-y} = 3$

$\Rightarrow 3^{x+y} = (3)^4$ and $(3)^{4(x-y)} = 3$

$\Rightarrow x+y = 4$ and $x-y = \frac{1}{4}$

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

$x-y = \frac{1}{4}$ .....(ii)

Solve equation (i) and (ii)

$x = \frac{17}{8}$, $y = \frac{15}{8}$, $\frac{x}{y} = \frac{17}{15}$

151. (b)

$\sqrt{2}$	$\sqrt[3]{9}$	$\sqrt[4]{16}$	$\sqrt[5]{32}$
↓	↓	↓	↓
1.41	$\sqrt[3]{9}$	2	2

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

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

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

152. (b)

$\sqrt[4]{3}$	$\sqrt[5]{4}$	$\sqrt[10]{12}$	1
↓	↓	↓	
$3^{1/4}$	$4^{1/5}$	$12^{1/10}$	1
↓	↓	↓	
$3^{5/20}$	$4^{4/20}$	$12^{2/20}$	1
↓	↓	↓	
$\sqrt[20]{243}$	$\sqrt[20]{\mathbf{256}}$	$\sqrt[20]{144}$	1

153. (c)

$3\sqrt{2}$	$3\sqrt{7}$	$6\sqrt{5}$	$2\sqrt{20}$
↓	↓	↓	↓
$\sqrt{9\times2}$	$\sqrt{9\times7}$	$\sqrt{36\times5}$	$\sqrt{4\times20}$
↓	↓	↓	↓
$\sqrt{18}$	$\sqrt{63}$	$\sqrt{180}$	$\sqrt{80}$

154. (d)

$\sqrt{0.09}$	$\sqrt[3]{0.064}$	0.5	3/5
↓	↓	↓	↓
0.3	0.4	0.5	**0.6**

155. (b)

0.16	$\sqrt{0.16}$	$(0.16)^2$	0.04
↓	↓	↓	↓
0.16	**0.40**	0.0256	0.04

156. (d)

$\sqrt[2]{8}$	$\sqrt[4]{13}$	$\sqrt[5]{16}$	$\sqrt[10]{41}$
↓	↓	↓	↓
$8^{1/2}$	$13^{1/4}$	$16^{1/5}$	$41^{1/10}$
$8^{10/20}$	$13^{5/20}$	$16^{4/20}$	$41^{2/20}$
↓	↓	↓	↓
$\sqrt[20]{8^{10}}$	$\sqrt[20]{13^5}$	$\sqrt[20]{16^4}$	$\sqrt[20]{41^2}$
↓	↓	↓	↓
$\sqrt[20]{64^5}$	$\sqrt[20]{13^5}$	$\sqrt[20]{256^2}$	$\sqrt[20]{41^2}$

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

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

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

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

$\Rightarrow 2\sqrt{2} + \sqrt{2} - \sqrt{2} \Rightarrow 2\sqrt{2}$

$\Rightarrow 2 \times 1.4142 = 2.8284$

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

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

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

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

$\Rightarrow$ put k = 1

$\Rightarrow 0.42 \times 100^1 = 42$

$\Rightarrow$ 42 = 42 Matched

So k = 1

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

$\Rightarrow 2 = k^{1/x}; 3 = k^{1/y} = 6 = k^{-1/z}$

$\therefore 2 \times 3 = 6$

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

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

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

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

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

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

$\Rightarrow \frac{2\sqrt{5}-2\sqrt{6}}{2} \Rightarrow \frac{2\left(\sqrt{5}-\sqrt{6}\right)}{2}$

$\Rightarrow \sqrt{5}-\sqrt{6}$

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

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

$\Rightarrow \frac{1}{256^{1/8}}$

$\Rightarrow \frac{1}{2^{8\times\frac{1}{8}}}$

$\Rightarrow \frac{1}{2}$

163. (b) $\mathbf{2\sqrt[3]{40}} \Rightarrow 2\times\sqrt[3]{2\times2\times2\times5}$

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

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

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

$\Rightarrow 4\times\sqrt[3]{4\times4\times4\times5}$

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

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

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

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

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

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

Now put the value in question

$\Rightarrow 4\sqrt[3]{5} - 16\sqrt[3]{5} + 15\sqrt[3]{5} - 3\sqrt[3]{5}$

$\Rightarrow 19\sqrt[3]{5} - 19\sqrt[3]{5}$

$\Rightarrow 0$

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

$\Rightarrow \sqrt[3]{0.05\times0.05\times0.05} \Rightarrow 0.05$

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

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

$\Rightarrow \frac{1\times5\times81}{9\times5\times2} \Rightarrow 4.5$

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

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

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

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

$\Rightarrow \left(x-\sqrt{24}\right) = \frac{\sqrt{75}-\sqrt{50}}{\sqrt{75}+\sqrt{50}}$

$\Rightarrow \left(x-\sqrt{24}\right) = \frac{\left(\sqrt{75}-\sqrt{50}\right)^2}{75-50}$

$\Rightarrow \left(x-\sqrt{24}\right) = \frac{75+50-2\sqrt{75}\sqrt{50}}{25}$

$\Rightarrow \left(x-\sqrt{24}\right) = \frac{125-2\times5\sqrt{3}\times5\sqrt{2}}{25}$

$\Rightarrow \left(x-\sqrt{24}\right) = \frac{125-50\sqrt{6}}{25}$

$\Rightarrow \left(x-\sqrt{24}\right) = \frac{25\left(5-2\sqrt{6}\right)}{25}$

$\Rightarrow x-2\sqrt{6} = 5-2\sqrt{6}$

$\Rightarrow x = 5$

168. (c)

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

$\Rightarrow 2\sqrt{5} + 2\sqrt{3} + 9$

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

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

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

$\Rightarrow 0$

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

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

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

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

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

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

$a = 9 < 9+\sqrt{3}+2\sqrt{2}+\sqrt{15} < 18$

$\sqrt{3} = 1.73,\ \sqrt{2} = 1.41,\ \sqrt{15} = 3.9$

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

$= 17.4 < 18$

170. (a) $a\sqrt{2} + b\sqrt{3} = \sqrt{98} + \sqrt{108}$

$-\sqrt{48} - \sqrt{72}$

$\Rightarrow \sqrt{7\times7\times2} + \sqrt{3\times3\times3\times2\times2}$

$-\sqrt{2\times2\times2\times2\times3} - \sqrt{3\times3\times2\times2\times2}$

$\Rightarrow 7\sqrt{2} + 6\sqrt{3} - 4\sqrt{3} - 6\sqrt{2}$

$a\sqrt{2} + b\sqrt{3} = 1\sqrt{2} + 2\sqrt{3}$

a = 1

b = 2

171. (a) $\sqrt[3]{a} = \sqrt[3]{26} + \sqrt[3]{7} + \sqrt[3]{63}$

Take round figure

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

$\Rightarrow \sqrt[3]{a} < 3 + 2 + 4$

$\Rightarrow \sqrt[3]{a} < 9$

$\Rightarrow a < 9^3$

$\Rightarrow a < 729$

Option A is answer

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

$\Rightarrow \frac{\sqrt{2\times2\times2\times3\times3}\times\sqrt{11\times11\times3}\times}{\sqrt{2\times2\times2\times2\times2}\times\sqrt{3\times7\times7}\times} \ldots\ldots$

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

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

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

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

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

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

$\Rightarrow 2+2\sqrt{3}+\left(\frac{2-\sqrt{3}-2-\sqrt{3}}{4-3}\right)$

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

$\Rightarrow 2$

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

$\Rightarrow \sqrt{7+4\sqrt{3}}$

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

$\Rightarrow \sqrt{\left(2+\sqrt{3}\right)^2}$

$\Rightarrow \left(2+\sqrt{3}\right)$

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

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

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

$\Rightarrow 8-4\sqrt{3}+6\sqrt{3}-9 = A+\sqrt{B}$

$\Rightarrow 2\sqrt{3}-1 = A+\sqrt{B}$

$A = -1$ and $\sqrt{B} = 2\sqrt{3}$

$B = 2\sqrt{3}\times 2\sqrt{3} = 12$

$B - A = 12 - (-1) = 13$

175. (b) $2\sqrt{50}+\sqrt{18}-\sqrt{72}$

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

$\Rightarrow 13\sqrt{2}-6\sqrt{2}$

$\Rightarrow 7\sqrt{2} \Rightarrow 7\times 1.414$

$\Rightarrow 9.898$

176. (d) $11\sqrt{n} = \sqrt{112}+\sqrt{343}$

$11\sqrt{n} = \sqrt{2\times 2\times 2\times 2\times 7}+\sqrt{7\times 7\times 7}$

$11\sqrt{n} = 4\sqrt{7}+7\sqrt{7}$

$11\sqrt{n} = 11\sqrt{7}$

$\sqrt{n} = \sqrt{7}$

$n = 7$

177. (b) $2^{250} \rightarrow (2^5)^{50} \rightarrow (32)^{50}$

$\Rightarrow 3^{150} \rightarrow (3^3)^{50} \rightarrow (27)^{50}$

$\Rightarrow 5^{100} \rightarrow (5^2)^{50} \rightarrow \mathbf{(25)^{50}}$

$\Rightarrow 4^{200} \rightarrow (4^4)^{50} \rightarrow (256)^{50}$

178. (c)

$\sqrt[3]{2}$		$\sqrt{3}$
$\downarrow$		$\downarrow$
$2^{1/3}$		$3^{1/2}$
$\downarrow$		$\downarrow$
$2^{2/6}$		$3^{3/6}$
$\sqrt[6]{4}$	<	$\sqrt[6]{27}$

179. (c) $4^{10}\times 7^3\times 16^2\times 11\times 10^2$

$\Rightarrow (2^2)^{10}\times(7)^3\times(2^4)^2\times 11^1\times 2^2\times 5^2$

$\Rightarrow 2^{20+8+2}\times 7^3\times 11^1\times 5^2$

$\Rightarrow 2^{30}\times 7^3\times 11^1\times 5^2$

Total factors $\Rightarrow 30+3+1+2$

$\Rightarrow 36$

180. (a) $6^{333}\times 7^{222}\times 8^{111}$

$\Rightarrow 2^{333}\times 3^{333}\times 7^{222}\times (2^3)^{111}$

$\Rightarrow 2^{666}\times 3^{333}\times 7^{222}$

$\Rightarrow$ Total factors $= 666+333+222$

$=1221$

181. (c) $\sqrt{30+\sqrt{30+\sqrt{30}}}$.....

⑥ $\times$ 5

182. (a) $x = \sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4}}}}$.....

$\Rightarrow$ Squaring both sides

$\Rightarrow x^2 = 2\sqrt[3]{4\sqrt{2\sqrt[3]{4}}}$ .....

Now cubing both sides

$x^6 = 8\times 4x$

$\Rightarrow x^5 = 32$

$\Rightarrow x^5 = 2^5$

$\Rightarrow x = 2$

183. (b) $a = 55, b = 17$

$c = -72$

$a+b+c = 55+17-72 = 0$

$\therefore a^3+b^3+c^3-3abc = 0$

$(a+b+c) = 0$

Answer = 0

184. (c) $\sqrt{4032}\times\sqrt{7}$

$\sqrt{4\times 9\times 4\times 4\times 7}\times\sqrt{7}$

$= 4\times 2\times 3\times 7 = 168$

4	4032
9	1008
4	112
4	28
	7

185. (b) $\frac{243^{n/5}\times 3^{2n+1}}{9^n\times 3^{n-1}}$

$\Rightarrow \frac{3^{5\times n/5}\times 3^{2n+1}}{3^{2n}\times 3^{n-1}}$

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

$\Rightarrow \frac{3^{n+2n+1}}{3^{2n+n-1}}$

$\Rightarrow \frac{3^{3n+1}}{3^{3n-1}}$

$\Rightarrow 3^{(3n+1)-(3n-1)}$

$\Rightarrow 3^{3n+1-3n+1}$

$\Rightarrow 3^2 = 9$

186. (c)

$\left(\sqrt{3}+1\right)\left(10+\sqrt{12}\right)\left(\sqrt{12}-2\right)\left(5-\sqrt{3}\right)$

$\Rightarrow \left(\sqrt{3}+1\right)\left(10+2\sqrt{3}\right)\left(2\sqrt{3}-2\right)\left(5-\sqrt{3}\right)$

$\Rightarrow \left(\sqrt{3}+1\right)\times 2\left(5+\sqrt{3}\right)\times 2\left(\sqrt{3}-1\right)\left(5-\sqrt{3}\right)$

$\Rightarrow 4\left(\sqrt{3}+1\right)\left(\sqrt{3}-1\right)\left(5+\sqrt{3}\right)\left(5-\sqrt{3}\right)$

$\Rightarrow 4\left[\left(\sqrt{3}\right)^2-1^2\right]\left[(5)^2-\left(\sqrt{3}\right)^2\right]$

$\Rightarrow 4\times 2\times 22 \Rightarrow 176$

187. (b) $(0.2)^3\times 200\div 2000$ of $(0.2)^2$

$\Rightarrow \frac{0.2\times 0.2\times 0.2\times 200}{2000\times 0.2\times 0.2}$

$\Rightarrow \frac{0.2\times 200}{2000}$

$\Rightarrow \frac{40.0}{2000} \Rightarrow \frac{1}{50}$

188. (a)

$\sqrt[3]{4}$,	$\sqrt{2}$,	$\sqrt[6]{3}$,	$\sqrt[4]{5}$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$4^{1/3}$	$2^{1/2}$	$3^{1/6}$	$5^{1/4}$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$4^{4/12}$	$2^{6/12}$	$3^{2/12}$	$5^{3/12}$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$\sqrt[12]{256}$	$\sqrt[12]{64}$	$\sqrt[12]{9}$	$\sqrt[12]{125}$

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

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

189. (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

$3^{1/4}\times[-(3)^{1/4}] = -\sqrt{3}$

190. (d) $2^{n-1}+2^{n+1} = 320$

$\Rightarrow 2^{n-1}(1+2^2) = 320$

$\Rightarrow 2^{n-1}(1+2^2) = 320$

$\Rightarrow 2^{n-1}\times 5 = 320$

$\Rightarrow 2^{n-1} = \frac{320}{5} = 64$

$\Rightarrow (2)^{n-1} = (2)^6$

$\Rightarrow n = 7$

191. (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

85 is divisible by 17

192. (a) $5\sqrt{5} \times 5^3 \div 5^{-3/2} = 5^{a+2}$

$\Rightarrow 5^1 \times 5^{1/2} \times 5^3 \div 5^{-3/2} = 5^{a+2}$

$\Rightarrow 5^{1+1/2+3-(-3/2)} = 5^{a+2}$

$\Rightarrow 5^{1+1/2+3+3/2} = 5^{a+2}$

$\Rightarrow 5^6 = 5^{a+2}$

$\Rightarrow a + 2 = 6$

$\Rightarrow a = 4$

193.(b) $\dfrac{3\sqrt{7}}{\sqrt{5}+\sqrt{2}} - \dfrac{5\sqrt{5}}{\sqrt{2}+\sqrt{7}} + \dfrac{2\sqrt{2}}{\sqrt{7}+\sqrt{5}}$

$= \dfrac{3\sqrt{7}}{\sqrt{5}+\sqrt{2}} \times \dfrac{\sqrt{5}-\sqrt{2}}{\sqrt{5}-\sqrt{2}} - \dfrac{5\sqrt{5}}{\sqrt{7}+\sqrt{2}} \times$

$\dfrac{\sqrt{7}-\sqrt{2}}{\sqrt{7}-\sqrt{2}} + \dfrac{2\sqrt{2}}{\sqrt{7}+\sqrt{5}} \times \dfrac{\sqrt{7}-\sqrt{5}}{\sqrt{7}+\sqrt{5}}$

$= \dfrac{3\sqrt{7}\left(\sqrt{5}-\sqrt{2}\right)}{\left(\sqrt{5}\right)^2-\left(\sqrt{2}\right)^2} - \dfrac{5\sqrt{5}\left(\sqrt{7}-\sqrt{2}\right)}{\left(\sqrt{7}\right)^2-\left(\sqrt{2}\right)^2}$

$+ \dfrac{2\sqrt{2}\left(\sqrt{7}-\sqrt{5}\right)}{\left(\sqrt{7}\right)^2-\left(\sqrt{5}\right)^2}$

$= \sqrt{35} - \sqrt{14} - \sqrt{35} + \sqrt{10} + \sqrt{14} - \sqrt{10}$

$= 0$

194. (d) $3^x - 3^{x-1} = 486$

$\Rightarrow 3^{x-1}(3-1) = 486 = 3^{x-1} = 243$

$\Rightarrow 3^{x-1} = 3^5 \Rightarrow x = 6$

195. (b) At the start t = 0°

$L = 2 - 2°$

$\Rightarrow 2 - 1 = 1$ cm

196. (c) $\dfrac{1}{\sqrt{7}-\sqrt{6}} - \dfrac{1}{\sqrt{6}-\sqrt{5}} +$

$\dfrac{1}{\sqrt{5}-2} - \dfrac{1}{\sqrt{8}-\sqrt{7}} + \dfrac{1}{3-\sqrt{8}}$

$\Rightarrow$ Rationalising

$\Rightarrow \dfrac{\sqrt{7}+\sqrt{6}}{\left(\sqrt{7}+\sqrt{6}\right)\left(\sqrt{7}-\sqrt{6}\right)} - \dfrac{1}{\left(\sqrt{6}-\sqrt{5}\right)}$

$\times \dfrac{\left(\sqrt{6}+\sqrt{5}\right)}{\left(\sqrt{6}+\sqrt{5}\right)} + \dfrac{\sqrt{5}+\sqrt{4}}{\left(\sqrt{5}-\sqrt{4}\right)\left(\sqrt{5}+\sqrt{4}\right)}$

$- \dfrac{\left(\sqrt{8}+\sqrt{7}\right)}{\left(\sqrt{8}+\sqrt{7}\right)\left(\sqrt{8}-\sqrt{7}\right)} + \dfrac{\left(\sqrt{9}+\sqrt{8}\right)}{\left(\sqrt{9}+\sqrt{8}\right)\left(\sqrt{9}-\sqrt{8}\right)}$

$\Rightarrow \dfrac{\sqrt{7}+\sqrt{6}}{1} - \dfrac{\left(\sqrt{6}+\sqrt{5}\right)}{1} +$

$\dfrac{\left(\sqrt{5}+\sqrt{4}\right)}{1} - \dfrac{\left(\sqrt{8}+\sqrt{7}\right)}{1} + \dfrac{\left(\sqrt{9}+\sqrt{8}\right)}{1}$

$\Rightarrow \sqrt{7} + \sqrt{6} - \sqrt{6} - \sqrt{5} + \sqrt{5} + \sqrt{4} - \sqrt{8} - \cdots$

$\sqrt{7} + \sqrt{9} + \sqrt{8}$

$\Rightarrow \sqrt{4} + \sqrt{9} = 2 + 3 = 5$

197. (c) from option (i)

$\Rightarrow \sqrt{6} + \sqrt{2} = \sqrt{5} + \sqrt{3}$

$\Rightarrow 8 + 2\sqrt{12} = 8 + 2\sqrt{15}$

(Squaring both side)

$\sqrt{12} \neq \sqrt{15}$

So option (i) is incorrect

From option (ii)

$\Rightarrow \sqrt{6} + \sqrt{2} < \sqrt{5} + \sqrt{3}$

$\Rightarrow 8 + 2\sqrt{12} < 8 + 2\sqrt{15}$

$2\sqrt{12} < 2\sqrt{15}$

$\Rightarrow$ So option (ii) is correct

$\Rightarrow$ by option (iii)

$\sqrt{6} + \sqrt{2} > \sqrt{5} + \sqrt{3}$

$8 + 2\sqrt{12} > 8 + 2\sqrt{15}$

$2\sqrt{12} < 2\sqrt{15}$

So option (iii) is also incorrect

Therefore Ans (c) option (i) & (iii)is incorrect

198. (d) $\dfrac{\sqrt{10+\sqrt{25+\sqrt{108+\sqrt{154+\sqrt{225}}}}}}{\sqrt[3]{8}}$

$\Rightarrow \dfrac{\sqrt{10+\sqrt{25+\sqrt{108+\sqrt{169}}}}}{2}$

$\Rightarrow \dfrac{\sqrt{10+\sqrt{25+\sqrt{121}}}}{2} \Rightarrow \dfrac{\sqrt{10+\sqrt{36}}}{2}$

$\Rightarrow \dfrac{\sqrt{16}}{2} \Rightarrow \dfrac{4}{2} \Rightarrow 2$

199. (c) $\sqrt{6+\sqrt{6+\sqrt{6+\ldots\ldots+\infty}}}$

(2, 3) are the factor of 6.

If there is '+' in '$\sqrt{\ }$' Answer is Highest value.

If there is '–' in '$\sqrt{\ }$', Answer is lowest value.

Alternate

$x = \sqrt{6+\sqrt{6+\sqrt{6+\ldots+\infty}}}$

(squaring both sides)

$x^2 = 6 + \sqrt{6+\sqrt{6+\ldots.\infty}}$

$x^2 = 6 + x$

$\left[\because \sqrt{6+\sqrt{6+\ldots.\infty}} = x\right]$

$x^2 - x - 6 = 0$

$x^2 - 3x + 2x - 6 = 0$

$x(x-3) + 2(x-3) = 0$

$(x+2)(x-3)$

$x = -2,$ & $x = 3$

x can not be negative

So, Answer is = 3

200. (d)

$\dfrac{\sqrt{6}+2}{\sqrt{2}+\sqrt{2}+\sqrt{3}} - \dfrac{\sqrt{6}-2}{\sqrt{2}-\sqrt{2}-\sqrt{3}} - \dfrac{2\sqrt{2}}{2+\sqrt{2}}$

$\Rightarrow \dfrac{\sqrt{6}+2}{\sqrt{2}+\dfrac{\sqrt{3}+1}{\sqrt{2}}} - \dfrac{\sqrt{6}-2}{\sqrt{2}-\dfrac{\sqrt{3}-1}{\sqrt{2}}} - \dfrac{2}{\sqrt{2}+1}$

$\Rightarrow \dfrac{\left(\sqrt{6}+2\right)\sqrt{2}}{2+\sqrt{3}+1} - \dfrac{\left(\sqrt{6}-2\right)\sqrt{2}}{2-\sqrt{3}+1} - \dfrac{2}{\sqrt{2}+1}$

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

$\dfrac{\sqrt{2}}{\sqrt{3}}\left[\dfrac{\sqrt{18}+2\sqrt{3}-\sqrt{6}-2-\sqrt{18}+2\sqrt{3}-\sqrt{6}+2}{3-1}\right]$

$- \dfrac{2\left(\sqrt{2}-1\right)}{2-1}$

$\Rightarrow \dfrac{\sqrt{2}}{\sqrt{3}}\left[2\dfrac{\left(-\sqrt{6}+2\sqrt{3}\right)}{2}\right] - 2\left(\sqrt{2}-1\right)$

$\Rightarrow -\sqrt{3} \times \sqrt{2} \times \dfrac{\sqrt{2}}{\sqrt{3}} + 2\sqrt{3} \times \dfrac{\sqrt{2}}{\sqrt{3}} - 2\left(\sqrt{2}-1\right)$

$\Rightarrow -2 + 2\sqrt{2} - 2\sqrt{2} + 2 = 0$

201. (a) $\dfrac{6^2+7^2+8^2+9^2+10^2}{\sqrt{7+4\sqrt{3}} - \sqrt{4+2\sqrt{3}}}$

$\Rightarrow \dfrac{6^2+7^2+8^2+9^2+10^2}{\sqrt{(2+\sqrt{3})^2} - \sqrt{(\sqrt{3}+1)^2}}$

$\Rightarrow \dfrac{6^2+7^2+8^2+9^2+10^2}{2+\sqrt{3}-\sqrt{3}-1}$

$\Rightarrow 6^2+7^2+8^2+9^2+10^2$

$\Rightarrow 36 + 49 + 64 + 81 + 100$

$\Rightarrow 330$

202. (d) $\frac{3x-2y}{2x+3y}=\frac{5}{6}$

$18x-12y=10x+15y$

$8x=27y$

$\frac{x}{y}=\frac{27}{8}$

$=\left[\frac{\sqrt[3]{x}+\sqrt[3]{y}}{\sqrt[3]{x}-\sqrt[3]{y}}\right]^2$

$=\left(\frac{\sqrt[3]{27}+\sqrt[3]{8}}{\sqrt[3]{27}-\sqrt[3]{8}}\right)^2$

$\Rightarrow\left(\frac{3+2}{3-2}\right)^2=(5)^2=25$ Ans.

203. (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

$=\left(\sqrt{2}-1\right)+\left(\sqrt{3}-\sqrt{2}\right)+\left(\sqrt{4}-\sqrt{3}\right)+\left(\sqrt{5}-\sqrt{4}\right)$

$+\left(\sqrt{6}-\sqrt{5}\right)+\left(\sqrt{7}-\sqrt{6}\right)+\left(\sqrt{8}-\sqrt{7}\right)+$

$\left(\sqrt{9}-\sqrt{8}\right)$

$=\sqrt{9}-1=3-1$

$=2$

204. (a) $\sqrt{72+\sqrt{72+\sqrt{72+\ldots.}}}$

9×8

205. (a) According to question,

$\because\ \sqrt{33}=5.745$

$\sqrt{\frac{3}{11}}$

$\Rightarrow\sqrt{\frac{3\times 11}{11\times 11}}\Rightarrow\sqrt{\frac{33}{11\times 11}}$

$\Rightarrow\frac{5.745}{11}\Rightarrow 0.5223$

206. (c) The exponential form of

$\Rightarrow\sqrt{\sqrt{2}\times\sqrt{3}}\Rightarrow\sqrt{6^{1/2}}$

$\Rightarrow\left(6^{1/2}\right)^{1/2}\Rightarrow 6^{1/4}$

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

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

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

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

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

$\Rightarrow 1$