

SURDS AND INDICES

घातांक और करणी

Class Notes by Aditya Ranjan Sir

Pre - 2-3
Mains - 4-5

TYPE - 01

BASIC QUESTIONS

$$\begin{aligned} x &= \sqrt{64} + \sqrt{121} - \sqrt{169} \\ &= 8 + 11 - 13 \\ &= \textcircled{6} \end{aligned}$$

$$\therefore x^2 = 6^2 = \underline{\underline{36}}$$

1. If $x = \sqrt{64} + \sqrt{121} - \sqrt{169}$, then find the value of x^2 .

यदि $x = \sqrt{64} + \sqrt{121} - \sqrt{169}$ है, तो x^2 का मान ज्ञात करें।

SSC CGL TIER- II 07/03/2023

(a) 16

(b) 25

☒ (c) 36

(d) 49

$$= 20 + 3 - 7$$

$$= \textcircled{16}$$

2. What value will come in place of question mark (?) in the following question?

निम्नलिखित प्रश्न में प्रश्नवाचक चिन्ह (?) के स्थान पर मान आयेगा?

$$\sqrt[3]{8000} + \sqrt[3]{27} - \sqrt[3]{343} = ?$$

PGT Math (Female) 10/07/2021 (Shift- 01)

- | | |
|-------------------|--------|
| (a) 9 | (b) 24 |
| (c) 16 | (d) 23 |

Square

$$(ab)^2 = ?$$

Ex:- $(23)^2$

$$\begin{array}{r} \underline{2^2} \quad \underline{2 \times 3 \times 2} \quad \underline{3^2} \\ 5 \quad 2 \quad 9 \end{array}$$

Ex:- $(96)^2$

$$\begin{array}{r} \underline{92} \quad \underline{1} \quad \underline{6} \end{array}$$

Ex:- $(13)^2$

$$\begin{array}{r} \underline{1} \quad \underline{6} \quad \underline{9} \end{array}$$

Ex:- $(83)^2$

$$\begin{array}{r} \underline{68} \quad \underline{8} \quad \underline{9} \end{array}$$

Ex:- $(43)^2$

$$\begin{array}{r} \underline{18} \quad \underline{4} \quad \underline{9} \\ 2 \end{array}$$

$$* (15)^2 = 225$$

$$* (25)^2 = 625$$

$$* (75)^2 = 5625$$

$$* (85)^2 = 7225$$

12X13

$$* (125)^2 = \underline{15625}$$

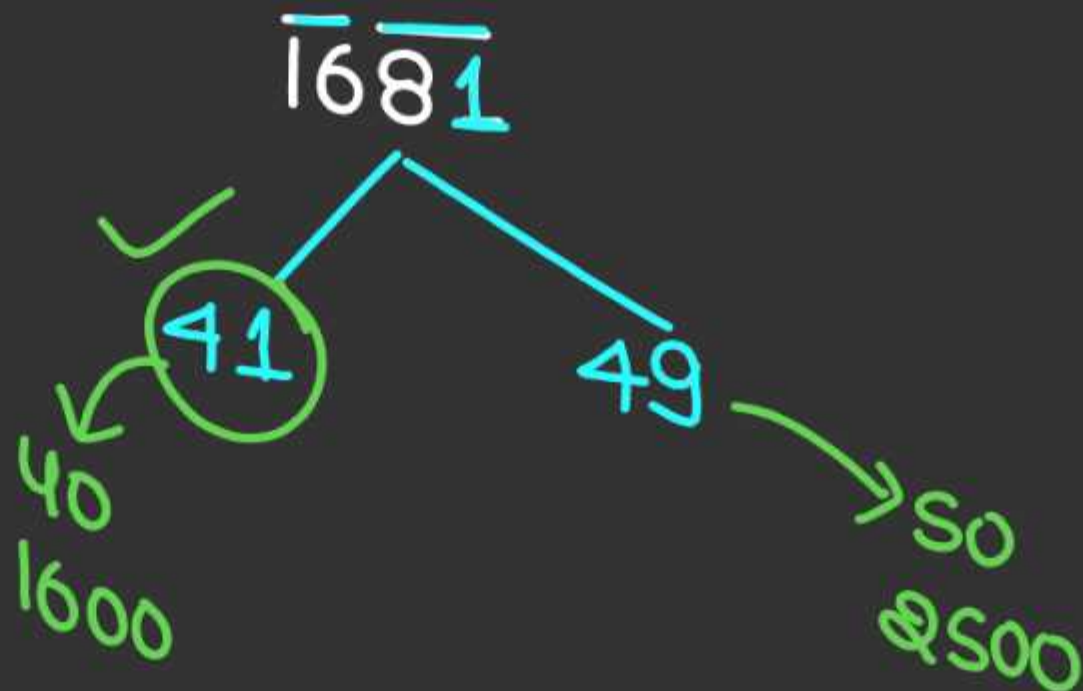
$$* (115)^2 = 13225$$

Square Root

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

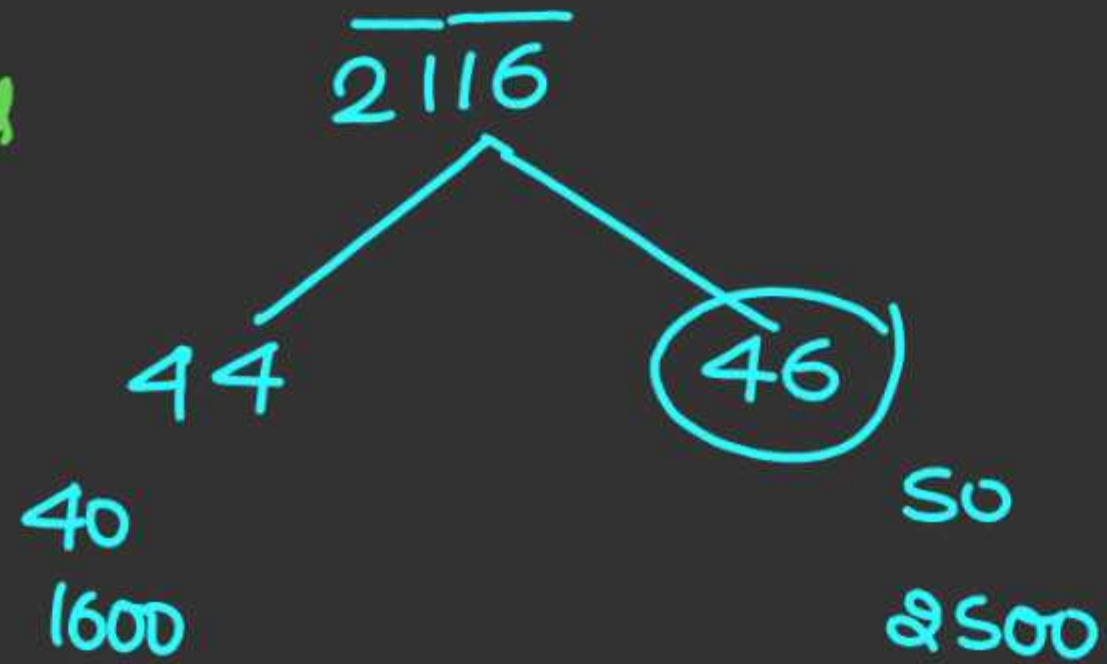
$$\sqrt{9} = (9)^{\frac{1}{2}} = (3)^{2 \times \frac{1}{2}} = 3$$

★ $\sqrt{1681}$



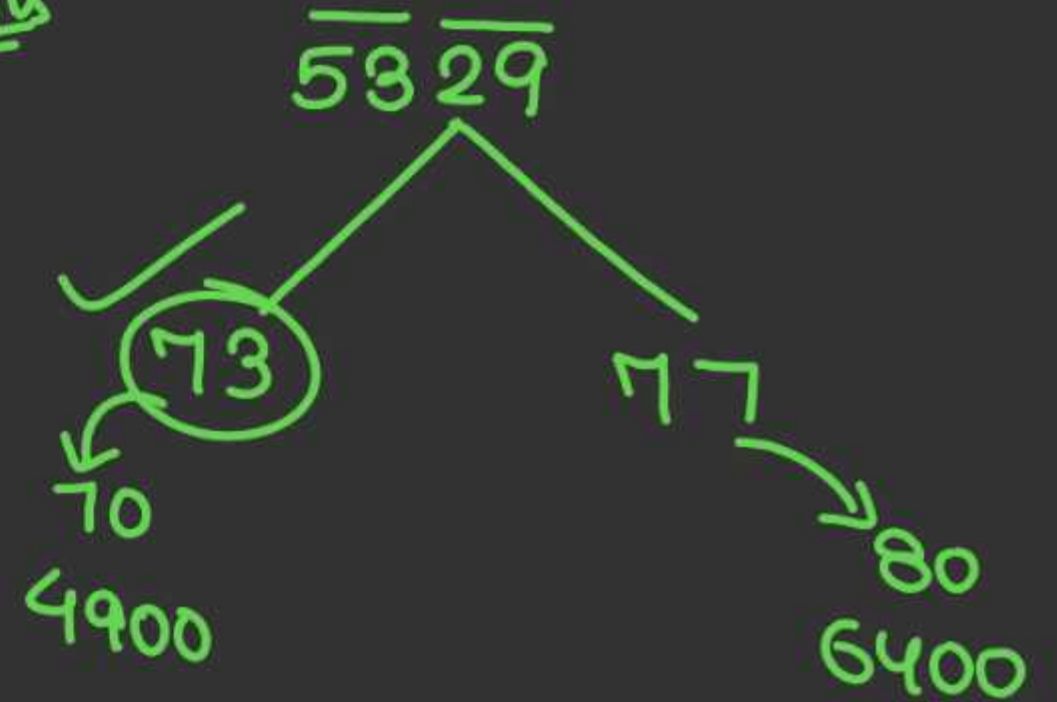
Q. $\sqrt{2116} = ?$

Ans



Q. $\sqrt{5329}$

Ans



3. Find the value of the given expression.

दिए गए व्यंजक का मान ज्ञात कीजिए।

$$\begin{aligned}
 &= \sqrt{8 + \sqrt{1681}} \\
 &= \sqrt{8 + 41} \\
 &= \sqrt{49} = 7
 \end{aligned}$$

$$\sqrt{8 + \sqrt{1681}}$$

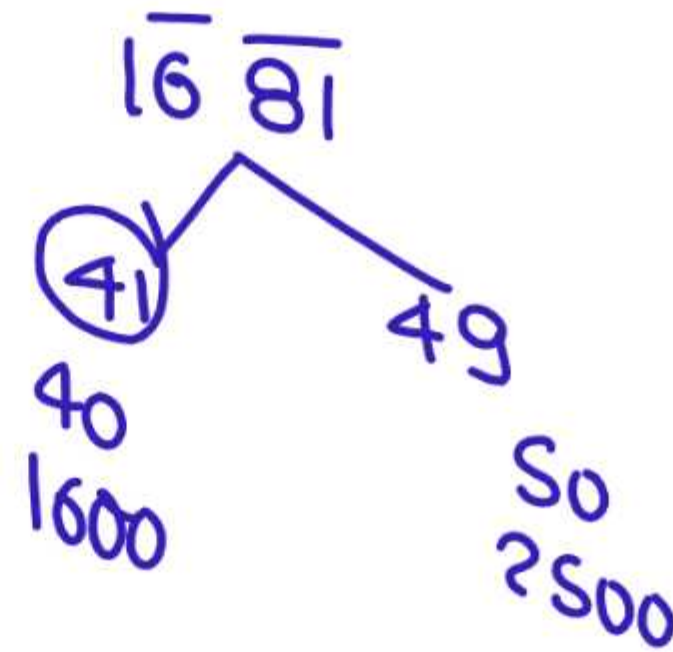
SSC CGL TIER- II 02/03/2023

(a) 5

(b) 6

(c) 4

(d) 7



4. Find the value of : $\sqrt{(9 + \sqrt{(36 + \sqrt{(144 + \sqrt{625}))})})}$

का मान ज्ञात कीजिए।

(a) 6

(b) 4

(c) 5

(d) 3

$$\begin{aligned}
 & \sqrt{9 + \sqrt{36 + \sqrt{144 + \sqrt{625}}}} \\
 = & \sqrt{9 + \sqrt{36 + \sqrt{169}}} \\
 = & \sqrt{9 + \sqrt{36 + 13}} \\
 = & \sqrt{9 + 7} = 4
 \end{aligned}$$

5. Find the value of: $\sqrt{(16 + \sqrt{(60 + \sqrt{(408 + \sqrt{1089}))})})}$

मान ज्ञात करें:

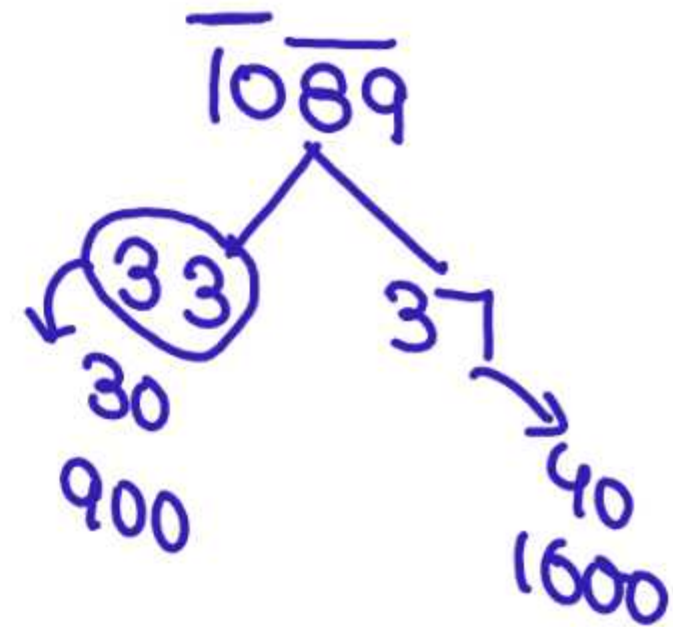
(a) 3

(b) 2

(c) 4

(d) 5

$$\begin{aligned}
 &= \sqrt{16 + \sqrt{60 + \sqrt{408 + \sqrt{1089}}}} \\
 &= \sqrt{16 + \sqrt{60 + \sqrt{408 + 33}}} \\
 &= \sqrt{16 + \sqrt{60 + \sqrt{441}}} \\
 &= \sqrt{16 + \sqrt{60 + 21}} \\
 &= \sqrt{16 + 9} = \sqrt{25} = 5
 \end{aligned}$$



6. $\sqrt{10 + \sqrt{25 + \sqrt{108 + \sqrt{154 + \sqrt{225}}}}} = ?$

$\sqrt{\underset{6}{10} + \sqrt{\underset{11}{25} + \sqrt{\underset{13}{108} + \sqrt{\underset{15}{154} + \sqrt{225}}}}} = ?$

~~(a) 4~~

(b) 2

(c) 8

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

7. Simplify (solve) the following. / निम्नलिखित को सरल (हल) कीजिए।

$$= \frac{4}{\sqrt{16+19.25 \times 16}}$$

$$= \frac{4}{\sqrt{16(1+19.25)}} = \frac{4}{\sqrt{20.25}}$$

$$= \frac{1}{\sqrt{20.25}} = \frac{1}{4.5}$$

$$\frac{\sqrt{10} + \sqrt{25} + \sqrt{108} + \sqrt{154} + \sqrt{225}}{\sqrt{16+19.25 \times 4^2}}$$

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(a) $\frac{7}{18}$

(b) $\frac{1}{9}$

(c) $\frac{2}{9}$

(d) $\frac{5}{18}$

$$\sqrt{2025} =$$

$$2025$$

$$45$$

$$\sqrt{0.04} = 0.2$$

$$\sqrt{0.0004} = .02$$

$$\sqrt{0.000004} = .002$$

7. Simplify (solve) the following. / निम्नलिखित को सरल (हल) कीजिए।

$$= \frac{4}{\sqrt{16 + 19.25 \times 16}}$$

$$= \frac{4}{\sqrt{16(1 + 19.25)}} = \frac{4}{\sqrt{20.25}}$$

$$= \frac{1}{\sqrt{20.25}} = \frac{1 \times 10^2}{45 \times 9}$$

(a) $\frac{7}{18}$

(b) $\frac{1}{9}$

(c) $\frac{2}{9}$

(d) $\frac{5}{18}$

$$\frac{\sqrt{10} + \sqrt{25} + \sqrt{108} + \sqrt{154} + \sqrt{225}}{\sqrt{16 + 19.25 \times 4^2}}$$

SSC CGL TIER- II 06/03/2023

$$\sqrt{2025} =$$

$$2025$$

$$45$$

8. $\sqrt{\sqrt{4489} - \sqrt{47^2 + 392}} = ?$

CRPF HCM 28/02/2023 (Shift- 01)

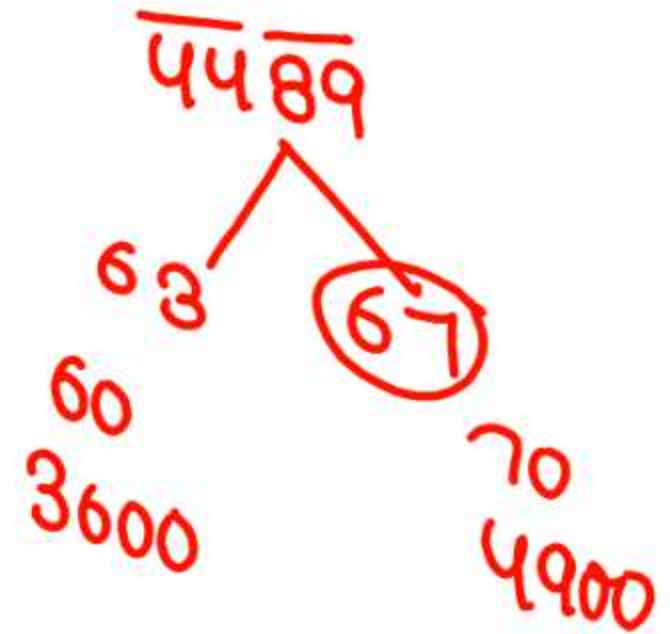
(a) 2

(b) 6

(c) 1

(d) 4

$$\begin{aligned}
 &= \sqrt{\sqrt{4489} - \sqrt{2209 + 392}} \\
 &= \sqrt{67 - \sqrt{2601}} \\
 &= \sqrt{67 - 51} \\
 &= \sqrt{16} = 4
 \end{aligned}$$



$$\cdot \sqrt{a} \text{ or } \sqrt[2]{a} = a^{\frac{1}{2}}$$

$$\cdot \sqrt[3]{a} = a^{\frac{1}{3}}$$

$$\cdot \sqrt[4]{a} = a^{\frac{1}{4}}$$

$$\cdot \sqrt[5]{a} = a^{\frac{1}{5}}$$

9. Find the value of $2\sqrt[3]{15637 - \sqrt{161 - \sqrt{289}}}$

का मान ज्ञात कीजिए?

- (a) ~~50~~ (b) 250
(c) 30 (d) 150

$$= 2\sqrt[3]{15637 - \sqrt{161 - 17}}$$

$$= 2\sqrt[3]{15637 - 12}$$

$$= 2\sqrt[3]{15625}$$

$$= 2 \times 25$$

$$= 50$$

$$\sqrt[3]{15625} = (25)^{3 \times \frac{1}{3}}$$

10. Solve/हल करें $\sqrt{21 + \sqrt[3]{59 + \sqrt{16 + \sqrt[3]{722 + \sqrt{49}}}}}$?

(a) 4

☒ (b) 5

(c) 6

(d) 7

$$\begin{aligned}
 &= \sqrt{21 + \sqrt[3]{59 + \sqrt{16 + \sqrt[3]{729}}}} \\
 &= \sqrt{21 + \sqrt[3]{59 + \sqrt{16 + 9}}} \\
 &= \sqrt{21 + \sqrt[3]{59 + 5}} \\
 &= \sqrt{21 + \sqrt[3]{64}} \\
 &= \sqrt{21 + 4} = 5
 \end{aligned}$$

$$A = (81)^{\frac{1}{4}}$$

$$A = (81)^{\frac{1}{4}}$$

$$A = (3)^{4 \times \frac{1}{4}}$$

$$A = 3$$

$$B = 3^{\frac{2}{3}} \times 3^{\frac{1}{3}}$$

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

$$B = 3^1$$

$$B = 3$$

$$A + B = 3 + 3 = \underline{\underline{6}}$$

11. If $A = \sqrt[8]{3\sqrt{(81^2)^3}}$ and $B = \sqrt[6]{3\sqrt{(3^4)^3}} \times \sqrt[6]{6\sqrt{(3^2)^6}}$ then what will the value $A + B$?

यदि $A = \sqrt[8]{3\sqrt{(81^2)^3}}$ तथा $B = \sqrt[6]{3\sqrt{(3^4)^3}} \times \sqrt[6]{6\sqrt{(3^2)^6}}$ तो $A + B$ का मान क्या है?

(a) 9

(b) 4

(c) 6

(d) 3

$$\sqrt[m]{\sqrt[p]{(a^m)^n}} = a^{\frac{m \times n \times o}{p \times q \times r}}$$

$$a^m \times a^n = a^{m+n}$$

$$\sqrt[m]{n((x)^a)^b} = x^{\frac{a \times b}{m \times n}}$$

11. If $A = \sqrt[8]{3\sqrt{(81^2)^3}}$ and $B = \sqrt[6]{3\sqrt{(3^4)^3}} \times \sqrt[6]{6\sqrt{(3^2)^6}}$ then what will the value $A + B$?

यदि $A = \sqrt[8]{3\sqrt{(81^2)^3}}$ तथा $B = \sqrt[6]{3\sqrt{(3^4)^3}} \times \sqrt[6]{6\sqrt{(3^2)^6}}$ तो $A + B$ का मान क्या है?

(a) 9

(b) 4

(c) 6

(d) 3

$$\begin{aligned} & \textcircled{3}^{\frac{2 \times 3}{8}} + \frac{2}{3}^{\frac{12}{6}} \times 3^{\frac{12}{6} \times \frac{1}{3}} \\ & 3 + 3^{\frac{2}{3}} \end{aligned}$$

✓

$$(2)^2 = 4$$

$$(0.2)^2 = 0.04$$

$$(0.\underline{02})^2 = 0.\underline{0004}$$

$$(0.\underline{002})^2 = 0.\underline{0000004}$$

$$\sqrt{0.04}$$

12. What is the value of $\left(\sqrt{(0.07)^2 + (0.24)^2}\right) \div 25$

का मान क्या है?

(a) 2.5

(b) 0.1

(c) 0.25

(d) 0.01

$$\begin{aligned} \text{ans} &= \sqrt{[(0.07)^2 + (0.24)^2]} \div 25 \\ &= \sqrt{0.0049 + 0.0576} \div 25 \\ &= \sqrt{0.0625} \div 25 \\ &= 0.25 \div 25 \\ &= 0.01 \end{aligned}$$

13. What is the value of $\sqrt[3]{0.02 + \sqrt{0.000049}}$

का मान क्या है?

(a) 3

(b) 0.003

(c) 0.03

☒ (d) 0.3

$$\begin{aligned}
 &= \sqrt[3]{0.02 + \sqrt{0.000049}} \\
 &= \sqrt[3]{0.02 + 0.007} \\
 &= \sqrt[3]{0.027} \\
 &= 0.3
 \end{aligned}$$

(100) +

$$101^2 = 10201$$

$$102^2 = 10404$$

$$103^2 = 10609$$

$$104^2 = 10816$$

$$105^2 = 11025$$

$$(107)^2 = 11449$$

$$(108)^2 = 11664$$

(100) -

$$99^2 = 9801$$

$$98^2 = 9604$$

$$97^2 = 9409$$

$$96^2 = 9216$$

$$95^2 = \underline{9025}$$

$$(103)^2 = (106 \times 1) 09 = 10609$$

$$(203)^2 = (206 \times 2) 09 = 41209$$

$$(303)^2 = (306 \times 3) 09 = 91809$$

$$(404)^2 = (408 \times 4) 16 = 163216$$

$$10.2 + 1.02 + 0.102$$

14.

$\sqrt{104.04} + \sqrt{1.0404} + \sqrt{0.010404}$ is equal to

$\sqrt{104.04} + \sqrt{1.0404} + \sqrt{0.010404}$ के बराबर है

(a) 0.306

(b) 0.0306

(c) 11.122

(d) 11.322

$$\begin{array}{r} 10.200 \\ 1.020 \\ 0.102 \\ \hline 11.322 \end{array}$$

$$(10404) = (102)^2$$

$$\begin{array}{c} 10404 \\ \swarrow \quad \searrow \\ 102 \quad 108 \\ \swarrow \quad \searrow \quad \searrow \\ 100 \quad 10000 \quad 110 \\ 12100 \end{array}$$

15. If $\sqrt{5329} = 73$, then value of

$$73 + 7.3 + 0.73 + 0.073 + 0.0073$$

$$\sqrt{5329} + \sqrt{53.29} + \sqrt{0.5329} + \sqrt{0.005329} + \sqrt{0.00005329} \text{ is}$$

यदि $\sqrt{5329} = 73$, तो

$$\sqrt{5329} + \sqrt{53.29} + \sqrt{0.5329} + \sqrt{0.005329} + \sqrt{0.00005329} \text{ का मान है}$$

(a) 81.1003

(b) 81.0113

✓ (c) 81.1103

(d) 81.1013

$$\begin{array}{r} 73.0 \\ 7.3 \\ 0.73 \\ 0.073 \\ 0.0073 \\ \hline 81.1103 \end{array}$$

$$A = \frac{0.02 \times 0.02}{\sqrt[4]{16000 \times 810 \times 50}}$$

$$A = \frac{(0.02)^2}{2 \times 3 \times 10 \times 50}$$

$A \times B$

$$= \frac{\cancel{0.02} \times \cancel{0.02} \times \cancel{0.9} \times \cancel{0.2}}{\cancel{2} \times \cancel{3} \times 10 \times 50} \times 10^5$$

$$= \frac{3}{5 \times 10^7} = \frac{3}{5} \times 10^{-7}$$

16. If $A = \frac{\sqrt{0.0004} \times \sqrt[3]{0.000008}}{\sqrt[4]{16000} \times \sqrt[3]{125000} \times \sqrt[4]{810}}$ and $B =$

$$\frac{\sqrt[3]{0.729} \times \sqrt[4]{0.0016}}{\sqrt{0.16}}, \text{ then what is } A \times B?$$

यदि $A = \frac{\sqrt{0.0004} \times \sqrt[3]{0.000008}}{\sqrt[4]{16000} \times \sqrt[3]{125000} \times \sqrt[4]{810}}$ और $B =$

$$\frac{\sqrt[3]{0.729} \times \sqrt[4]{0.0016}}{\sqrt{0.16}} \text{ है, तो } A \times B \text{ क्या है?}$$

SSC CGL MAINS (08/08/2022)

(a) 5×10^{-8}

(b) 7×10^{-7}

(c) $\left(\frac{7}{4}\right) \times 10^{-8}$

(d) $\left(\frac{7}{3}\right) \times 10^{-7}$

$$\sqrt{\frac{9}{15625} \times \frac{10^9}{10^9}}$$

$$= \frac{3}{125} = 0.024$$

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

(a) 2.4 (b) 24
 (c) 0.024 (d) 0.24

$$\frac{3}{2} = 0.6$$

$$\frac{3}{25} = 0.12$$

$$\frac{3}{125} = 0.024$$

$$\sqrt[12]{15625}$$

$$\begin{aligned}
 & \sqrt{\frac{1}{4} \times \frac{10^4}{10^2}} + \sqrt{\frac{1}{4} \times \frac{10^2}{10^4}} + \sqrt{1 \times \frac{10^2}{10^4}} \\
 = & \sqrt{\frac{1}{4} \times 10^2} + \sqrt{\frac{1}{4} \times \frac{1}{10^2}} + \sqrt{\frac{1}{10^2}} \\
 = & \frac{10}{2} + \frac{1}{2 \times 10} + \frac{1}{10} \\
 = & 5 + \frac{1}{20} + \frac{1}{10} = \frac{100 + 1 + 2}{20}
 \end{aligned}$$

18. What is the value of

$$\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}} ?$$

$$\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}} \text{ का मान क्या है?}$$

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(a) $\frac{101}{20}$

(c) $\frac{26}{5}$

✓ (b) $\frac{103}{20}$

(d) $\frac{27}{5}$

$$\frac{10}{2} + \frac{1}{20} + \frac{1}{10}$$

$$= \frac{100 + 1 + 2}{20}$$

18. What is the value of

$$\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}} ?$$

$$\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}} \text{ का मान क्या है?}$$

SSC CGL MAINS (08/08/2022)

(a) $\frac{101}{20}$

✓ (b) $\frac{103}{20}$

(c) $\frac{26}{5}$

(d) $\frac{27}{5}$

$$\cdot (II)^2 = \underline{121}$$

$$\cdot (III)^2 = 12321$$

$$\cdot (IIII)^2 = 1234321$$

$$\cdot (IIIII)^2 = \underline{123454321}$$

19. Which of the following statement(s) is/are TRUE? / निम्नलिखित में से कौन-सा/से कथन सत्य/हैं/?

I. $\sqrt{121} + \sqrt{12321} + \sqrt{1234321} = 1233$ ✓

II. $\sqrt{0.64} + \sqrt{64} + \sqrt{36} + \sqrt{0.36} > 15$
 15.4

(a) Only I

(b) Only II

(c) Neither in or II

✓ (d) Both I and II

$$0.8 + 8 + 6 + 0.6 = 15.4$$

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

$$= \frac{\sqrt{16 \times 5} - \sqrt{16 \times 7}}{\sqrt{9 \times 5} - \sqrt{9 \times 7}}$$

$$= \frac{4\sqrt{5} - 4\sqrt{7}}{3\sqrt{5} - 3\sqrt{7}}$$

$$= \frac{4(\cancel{\sqrt{5}} - \sqrt{7})}{3(\cancel{\sqrt{5}} - \sqrt{7})}$$

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

$\frac{\sqrt{80} - \sqrt{112}}{\sqrt{45} - \sqrt{63}}$ का मान है:

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

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

✓ (c) $1\frac{1}{3}$

(d) $1\frac{7}{9}$

$$\frac{\sqrt{36 \times 2} \times \sqrt{3 \times 121} \times \sqrt{25 \times 7}}{\sqrt{16 \times 2} \times \sqrt{49 \times 3} \times \sqrt{4 \times 9 \times 7}}$$

$$= \frac{\cancel{6} \times \cancel{2} \times \cancel{11} \times \cancel{3} \times 5 \times \cancel{7}}{4 \times \cancel{2} \times 7 \times \cancel{3} \times \cancel{2} \times \cancel{3} \times \cancel{7}}$$

$$= \frac{55}{28}$$

21. The value of $\frac{\sqrt{72} \times \sqrt{363} \times \sqrt{175}}{\sqrt{32} \times \sqrt{147} \times \sqrt{252}}$ is.

का मान ज्ञात करें।

(a) $\frac{55}{42}$

(b) $\frac{45}{56}$

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

✓ (d) $\frac{55}{28}$

$$\frac{3\sqrt{4 \times 2} - 2\sqrt{4 \times 3} + \sqrt{4 \times 5}}{3\sqrt{9 \times 2} - 2\sqrt{9 \times 3} + \sqrt{9 \times 5}}$$

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

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

22. The simplest value of $\frac{3\sqrt{8} - 2\sqrt{12} + \sqrt{20}}{3\sqrt{18} - 2\sqrt{27} + \sqrt{45}}$

का मान ज्ञात करें।

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

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

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

(d) 2

TYPE - 02

**IF SQUARE ROOT IS
INSIDE SQUARE ROOT**

.

Q. $x = \sqrt{10 + 2\sqrt{21}}$

$$\sqrt{7} + \sqrt{3}$$

(a) $\sqrt{7} + \sqrt{5}$

☒ (b) $\sqrt{7} + \sqrt{3}$

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

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

$$Q. \sqrt{15 + 2\sqrt{54}} = \sqrt{9} + \sqrt{6} = 3 + \sqrt{6}$$

$$Q. \sqrt{18 + 2\sqrt{45}} = \sqrt{15} + \sqrt{3}$$

$$Q. \sqrt{13 - 2\sqrt{42}} = \sqrt{7} - \sqrt{6}$$

$$Q. \sqrt{11 - 2\sqrt{24}} = \sqrt{8} - \sqrt{3}$$

$$\begin{aligned}
 * \sqrt{5 + \sqrt{21}} \\
 &= \sqrt{\frac{10 + 2\sqrt{21}}{2}} \\
 &= \frac{\sqrt{7} + \sqrt{3}}{\sqrt{2}}
 \end{aligned}$$

$$\begin{aligned}
 * \sqrt{6 + \sqrt{32}} &= \\
 &= \sqrt{\frac{12 + 2\sqrt{32}}{2}} \\
 &= \frac{\sqrt{8} + \sqrt{4}}{\sqrt{2}} \\
 &= \sqrt{4} + \sqrt{2} \\
 &= \textcircled{2 + \sqrt{2}}
 \end{aligned}$$

$$\begin{aligned}
 x &= \sqrt{14 + 6\sqrt{5}} \\
 &= \sqrt{14 + 2 \times 3\sqrt{5}} \\
 &= \sqrt{14 + 2\sqrt{45}} \\
 &= \sqrt{9} + \sqrt{5} \\
 &= 3 + \sqrt{5}
 \end{aligned}$$

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

$14 + 6\sqrt{5}$ का वर्गमूल है

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

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

☒ (b) $3 + \sqrt{5}$

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

24. What is the value of positive square root of $30 + 10\sqrt{5}$?

$30 + 10\sqrt{5}$ का धनात्मक वर्गमूल का मान क्या है?

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

(b) $4 + 2\sqrt{5}$

☒ (c) $5 + \sqrt{5}$

(d) $6 + \sqrt{5}$

$$\begin{aligned} & \sqrt{30 + 10\sqrt{5}} \\ = & \sqrt{30 + 2 \times 5 \sqrt{5}} \\ = & \sqrt{30 + 2\sqrt{25 \times 5}} \\ = & \sqrt{25 + 5} + \sqrt{5} \\ = & 5 + \sqrt{5} \end{aligned}$$

26. What is the value of $\sqrt{3} + \sqrt{93 - 36\sqrt{3}}$?

$\sqrt{3} + \sqrt{93 - 36\sqrt{3}}$ का मान क्या है?

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

(b) $9 + \sqrt{3}$

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

(d) $9 - \sqrt{3}$

$$\begin{array}{r} 93 \\ -81 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 81 \\ -12 \\ \hline \hline \end{array}$$

$$\begin{aligned} & \sqrt{3} + \sqrt{93 - 2 \times 18\sqrt{3}} \\ &= \sqrt{3} + \sqrt{93 - 2\sqrt{9 \times 12}} \\ &= \sqrt{3} + \sqrt{81} - \sqrt{12} \\ &= \sqrt{3} + 9 - 2\sqrt{3} \\ &= 9 - \sqrt{3} \end{aligned}$$

$$\begin{aligned}
 A &= \sqrt{41 + 24\sqrt{2}} \\
 &= \sqrt{41 + 2 \times 12\sqrt{2}} \\
 &= \sqrt{41 + 2\sqrt{288}} \\
 &= \sqrt{32} + \sqrt{9} \\
 &= (4\sqrt{2} + 3)
 \end{aligned}$$

$$\begin{aligned}
 B &= \sqrt{36 - 16\sqrt{2}} \\
 &= \sqrt{36 - 2 \times 8\sqrt{2}} \\
 &= \sqrt{36 - 2\sqrt{128}} \\
 &= \sqrt{32} - \sqrt{4} \\
 &= 4\sqrt{2} - 2
 \end{aligned}$$

$$\begin{aligned}
 &(4\sqrt{2} + 3) - (4\sqrt{2} - 2) \\
 &= \cancel{4\sqrt{2}} + 3 - \cancel{4\sqrt{2}} + 2 \\
 &\quad \textcircled{5}
 \end{aligned}$$

27.

If the positive square root of $41 + 24\sqrt{2}$ is A and positive square root of $36 - 16\sqrt{2}$ is B, then what is the value of A - B?

यदि $41 + 24\sqrt{2}$ का धनात्मक वर्गमूल A और $36 - 16\sqrt{2}$ का धनात्मक वर्गमूल B है, तो A - B का मान क्या है?

(a) 3

(b) 1

(c) 2

(d) 5

28. If $x = \sqrt{31 + 2\sqrt{30}} - \sqrt{31 - 2\sqrt{30}}$, then what is the value of x ?

यदि $x = \sqrt{31 + 2\sqrt{30}} - \sqrt{31 - 2\sqrt{30}}$ तो x का मान क्या है?

CRPF HCM 22/02/2023 (Shift - 02)

(a) 2

(b) $2\sqrt{2}$

(c) $2\sqrt{15}$

(d) 4

$$\begin{aligned} x &= (\sqrt{30} + \sqrt{1}) - (\sqrt{30} - \sqrt{1}) \\ &= \cancel{\sqrt{30}} + 1 - \cancel{\sqrt{30}} + 1 \\ &= 2 \end{aligned}$$

$$\textcircled{Q}. x = \sqrt{a+b} + \sqrt{a-b}$$

$$\underline{\text{Ans}} \quad (x)^2 = [\sqrt{a+b} + \sqrt{a-b}]^2$$

$$\Rightarrow x^2 = (\sqrt{a+b})^2 + (\sqrt{a-b})^2 + 2\sqrt{(a+b)(a-b)}$$

$$\Rightarrow x^2 = a + \cancel{b} + a - \cancel{b} + 2\sqrt{a^2 - b^2}$$

$$\Rightarrow x^2 = 2a + 2\sqrt{a^2 - b^2}$$

$$x^2 = 2a + 2\sqrt{a^2 - b^2}$$

$$\Rightarrow x^2 = 2 \times 4 + 2\sqrt{16 - (\sqrt{10+2\sqrt{5}})^2}$$

$$\Rightarrow x^2 = 8 + 2\sqrt{16 - (10 + 2\sqrt{5})}$$

$$\Rightarrow x^2 = 8 + 2\sqrt{6 - 2\sqrt{5}}$$

$$\Rightarrow x^2 = 8 + 2(\sqrt{5} - 1)$$

$$\Rightarrow x^2 = 8 + 2\sqrt{5} - 2$$

$$\Rightarrow x = \sqrt{6 + 2\sqrt{5}}$$

$$\Rightarrow x = \sqrt{5} + 1$$

$$\Rightarrow x = 2.23 + 1 = 3.23$$

29. If $x = \sqrt{4 + \sqrt{10 + 2\sqrt{5}}} + \sqrt{4 - \sqrt{10 + 2\sqrt{5}}}$, then the value of x lies between:

यदि $x = \sqrt{4 + \sqrt{10 + 2\sqrt{5}}} + \sqrt{4 - \sqrt{10 + 2\sqrt{5}}}$, तो x का मान इनके बीच स्थित है:

CRPF HCM 28/02/2023 (Shift - 03)

(a) 3.8 and 4.2

(b) 3.4 and 4.8

✓ (c) 3 and 3.4

(d) 2.6 and 3

$$\begin{aligned}\sqrt{2} &= 1.414 \\ \sqrt{3} &= 1.732 \\ \sqrt{5} &= 2.236\end{aligned}$$

$$\sqrt{5+2\sqrt{6}} = \sqrt{3} + \sqrt{2}$$

$$\begin{aligned}\sqrt{15+4\sqrt{14}} &= \sqrt{15+2 \times 2\sqrt{14}} \\ &= \sqrt{15+2\sqrt{56}} \\ &= \sqrt{8} + \sqrt{7} = \sqrt{x} + \sqrt{y}\end{aligned}$$

$$\begin{aligned}x &= 8 \\ y &= 7\end{aligned}$$

$$xy = 56$$

30. Which of the following statement is correct?

निम्नलिखित में से कौन सा कथन सही है?

I. ✓ The square root of $5 + 2\sqrt{6}$ is $\sqrt{2} + \sqrt{3}$

$5 + 2\sqrt{6}$ का वर्गमूल $\sqrt{2} + \sqrt{3}$ है।

II. ✗ If $\sqrt{15+4\sqrt{14}} = \sqrt{x} + \sqrt{y}$, then $x + y = 15$ and $xy = 50$.

यदि $\sqrt{15+4\sqrt{14}} = \sqrt{x} + \sqrt{y}$, है, तो $x + y = 15$ तथा $xy = 50$ है।

(a) Neither I nor II

(c) Both I and II

✓ (b) Only I

(d) Only II

31. If $(\sqrt{14 + a\sqrt{3}})^2 = (\sqrt{8} + \sqrt{6})^2$ then what is the value of a ?

यदि $\sqrt{14 + a\sqrt{3}} = \sqrt{8} + \sqrt{6}$ है, तो a का मान क्या है?

(a) 4

(b) 6

(c) 5

(d) 8

$(\sqrt{a} + \sqrt{b})^2$ ✓

$$14 + a\sqrt{3} = 8 + 6 + 2\sqrt{8 \times 6}$$

$$\Rightarrow \cancel{14} + a\sqrt{3} = \cancel{14} + 2\sqrt{48}$$

$$\Rightarrow a\sqrt{3} = 2 \times 4\sqrt{3}$$

$$\underline{a = 8}$$

$$\begin{aligned}\sqrt{48} &= \sqrt{16 \times 3} \\ &= 4\sqrt{3}\end{aligned}$$

$$\begin{aligned}
 & \sqrt{52 - 30\sqrt{3}} \\
 &= \sqrt{52 - 2 \times 15\sqrt{3}} \\
 &= \sqrt{52 - 2\sqrt{675}} \\
 &= \sqrt{25} - \sqrt{25} \\
 &= \boxed{3\sqrt{3} - 5} = a + b\sqrt{3}
 \end{aligned}$$

$$3\cancel{\sqrt{3}} = b\cancel{\sqrt{3}} \quad | \quad -5 = a$$

$$a + b = -5 + 3 = -2$$

32. If $\sqrt{52 - 30\sqrt{3}} = a + b\sqrt{3}$, then $(a + b)$ is equal to:

यदि $\sqrt{52 - 30\sqrt{3}} = a + b\sqrt{3}$, तो $(a + b)$ बराबर है:

(a) 4

(b) -4

(c) -2

(d) 2

$$\begin{aligned}
 & \sqrt{54 - 20\sqrt{2}} \\
 &= \sqrt{54 - 2 \times 10\sqrt{2}} \\
 &= \sqrt{54 - 2\sqrt{200}} \\
 &= \sqrt{50} - \sqrt{4} \\
 &\Rightarrow \boxed{5\sqrt{2} - 2} = a + b\sqrt{2}
 \end{aligned}$$

$$\begin{array}{l|l}
 5\cancel{\sqrt{2}} = b\cancel{\sqrt{2}} & \boxed{-2 = a} \\
 b = 5 &
 \end{array}$$

33. If $\sqrt{54 - 20\sqrt{2}} = a + b\sqrt{2}$, then $(2a + 3b)$ is equal to:

यदि $\sqrt{54 - 20\sqrt{2}} = a + b\sqrt{2}$, तो $(2a + 3b)$ बराबर है:

(a) 8

(b) 4

(c) -3

☒ (d) 11

$$\begin{aligned}
 2a + 3b &= -4 + 15 \\
 &= 11
 \end{aligned}$$

$$\begin{aligned} & \sqrt{29 - 2 \times 6\sqrt{5}} \\ &= \sqrt{29 - 2\sqrt{180}} \\ &= \sqrt{20} - \sqrt{9} \\ &= \boxed{2\sqrt{5} - 3} = a + b\sqrt{5} \end{aligned}$$

$$\cancel{2\sqrt{5}} = \cancel{b\sqrt{5}} \quad | \quad \boxed{-3 = a}$$

$$\boxed{b = 2}$$

$$\begin{aligned} \therefore 2a + 3b & \\ &= -6 + 6 \\ &= 0 \end{aligned}$$

34. If $\sqrt{29 - 12\sqrt{5}} = a + b\sqrt{5}$, then the value $(2a + 3b)$ is:

यदि $\sqrt{29 - 12\sqrt{5}} = a + b\sqrt{5}$, तो $(2a + 3b)$ का मान है:

(a) 0
(c) 5

(b) -1
(d) -5

$$\begin{aligned}
 & \sqrt{43 - 24\sqrt{3}} \\
 &= \sqrt{43 - 2 \times 12\sqrt{3}} \\
 &= \sqrt{43 - 2\sqrt{432}} \\
 &= \sqrt{27} - \sqrt{16} \\
 &\Rightarrow \underline{3\sqrt{3}} - 4 = a + b\sqrt{3}
 \end{aligned}$$

$$\begin{array}{l|l}
 \cancel{3\sqrt{3}} = \cancel{b\sqrt{3}} & -4 = a \\
 \hline
 b = 3 &
 \end{array}$$

35. If $\sqrt{43 - 24\sqrt{3}} = a + b\sqrt{3}$, then the value of $(3a + 5b)$ is equal to which of the following?

अगर $\sqrt{43 - 24\sqrt{3}} = a + b\sqrt{3}$, हो, तो $(3a + 5b)$ का मान निम्नलिखित में से किसके बराबर होगा?

(a) -8

(c) 12

☒ (b) 3

(d) -11

$$\begin{aligned}
 & 3a + 5b \\
 &= -12 + 15 \\
 &= 3
 \end{aligned}$$

$$\begin{aligned} & \sqrt{73 - 2 \times 20\sqrt{3}} \\ &= \sqrt{73 - 2\sqrt{1200}} \\ &= \sqrt{48} - \sqrt{25} \\ &= \boxed{4\sqrt{3} - 5} = a + b\sqrt{3} \end{aligned}$$

$$4\cancel{\sqrt{3}} = b\cancel{\sqrt{3}}$$

$$\boxed{b=4}$$

$$\boxed{-5=a}$$

$$\begin{aligned} \therefore 3a + 2b \\ &= -15 + 8 \\ &= -7 \end{aligned}$$

36. If $\sqrt{73 - 40\sqrt{3}} = a + b\sqrt{3}$, then the value of $(3a + 2b)$ is equal to which of the following?

अगर $\sqrt{73 - 40\sqrt{3}} = a + b\sqrt{3}$, हो, तो $(3a + 2b)$ का मान निम्नलिखित में से किसके बराबर है?

(a) -2

(b) 7

(c) 2

(d) ☒ -7

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

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

$$x - y$$

$$= \frac{1}{\sqrt{3}} - (7 - 4\sqrt{3})$$

$$= \frac{\sqrt{3}}{3} + 4\sqrt{3} - 7$$

$$= \frac{13\sqrt{3}}{3} - 7$$

$$= \frac{13 \times 1.7}{3} - 7 = \frac{22.1}{3} - 7 = 7.3 - 7 = 0.3$$

37. If $x = \frac{5\sqrt{3} - \sqrt{48} - 4\sqrt{2} + \sqrt{50}}{3 + \sqrt{6}}$ and $y = 7 - 4\sqrt{3}$
 then the value of $(x - y)$ is closest to: (Take $\sqrt{3} = 1.7$)

यदि $x = \frac{5\sqrt{3} - \sqrt{48} - 4\sqrt{2} + \sqrt{50}}{3 + \sqrt{6}}$ और $y = 7 - 4\sqrt{3}$

तो $(x - y)$ का मान निकटतम है:

(a) 0.3

(b) 0.8

(c) 0.4

(d) 0.6

$$\leftarrow \check{\left(a + \frac{1}{a}\right)} \leftarrow \left(a^2 + \frac{1}{a^2}\right)$$

$$a = \sqrt{11 + 4\sqrt{6}}$$

$$a = \sqrt{11 + 2\sqrt{24}}$$

$$a^2 = 11 + 2\sqrt{24}$$

$$\begin{aligned} & \frac{(11 + 2\sqrt{24}) + \frac{1}{(11 + 2\sqrt{24})}}{(11 + 2\sqrt{24}) + \frac{11 - 2\sqrt{24}}{25}} \\ &= \frac{275 + 50\sqrt{24} + 11 - 2\sqrt{24}}{25} \\ &= \frac{286 + 48\sqrt{24}}{25} \\ &= \frac{286 + 96\sqrt{6}}{25} \end{aligned}$$

38. If $a = \sqrt{11 + 4\sqrt{6}}$, then what is the value of

$$\frac{1 + a^4}{a^2} \quad \frac{1}{a^2} + a^2$$

यदि $a = \sqrt{11 + 4\sqrt{6}}$, है, तो $\frac{1 + a^4}{a^2}$ का मान क्या है?

(a) $\frac{286 + 96\sqrt{6}}{25}$

(b) $\frac{186 + 95\sqrt{6}}{22}$

(c) $\frac{272 + 90\sqrt{6}}{21}$

(d) $\frac{95 + 98\sqrt{6}}{24}$

$$b = \sqrt{6 + \sqrt{11}}$$

$$= \sqrt{\frac{12 + 2\sqrt{11}}{2}}$$

$$b = \frac{\sqrt{11} + 1}{\sqrt{2}}$$

$$a = \frac{\sqrt{11} - 1}{\sqrt{2}}$$

$$\begin{aligned} b - a &= \left(\frac{\sqrt{11} + 1}{\sqrt{2}} \right) - \left(\frac{\sqrt{11} - 1}{\sqrt{2}} \right) \\ &= \frac{1 + 1}{\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2} \end{aligned}$$

39. If $a = \sqrt{6 - \sqrt{11}}$ and $b = \sqrt{6 + \sqrt{11}}$, then what is the value of $(b - a)$?

यदि $a = \sqrt{6 - \sqrt{11}}$ और $b = \sqrt{6 + \sqrt{11}}$ है, तो $(b - a)$ का मान क्या है?

(a) $\sqrt{6}$

(c) $\sqrt{22}$

☒ (b) $\sqrt{2}$

(d) $\sqrt{3}$

40. If $x = \sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{7 + 4\sqrt{3}}}}$ where $x > 0$, then the value of x is equal to:

यदि $x = \sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{7 + 4\sqrt{3}}}}$ जहाँ $x > 0$, तो x का मान इसके बराबर है:

- (a) 3
(c) 1

- (b) 4
(d) 2

$$\begin{aligned}
 x &= \sqrt{-\sqrt{3} + \sqrt{3 + 8(2 + \sqrt{3})}} \\
 &= \sqrt{-\sqrt{3} + \sqrt{3 + 16 + 8\sqrt{3}}} \\
 &= \sqrt{-\sqrt{3} + \sqrt{19 + 2\sqrt{48}}} \\
 &= \sqrt{-\sqrt{3} + \sqrt{16 + 4\sqrt{3}}} \\
 &= \sqrt{4} = 2
 \end{aligned}$$

$$\star (a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac$$

$$\begin{aligned}\star (\sqrt{x} + \sqrt{y} + \sqrt{z})^2 &= (\sqrt{x})^2 + (\sqrt{y})^2 + (\sqrt{z})^2 + 2\sqrt{x}\sqrt{y} + 2\sqrt{y}\sqrt{z} \\ &\quad + 2\sqrt{x}\sqrt{z} \\ &= \underline{x+y+z} + 2\sqrt{xy} + 2\sqrt{yz} + 2\sqrt{xz}\end{aligned}$$

✓

41. Evaluate $\sqrt{10 + 2\sqrt{6} + 2\sqrt{10} + 2\sqrt{15}}$

मूल्यांकन करे $\sqrt{10 + 2\sqrt{6} + 2\sqrt{10} + 2\sqrt{15}}$

~~(a)~~ $\sqrt{2} + \sqrt{3}$

~~(b)~~ $\sqrt{3} + \sqrt{5}$

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

(d) $\sqrt{3} + \sqrt{5} + \sqrt{7}$

$$\begin{aligned} &= 2 + 3 + 5 + 2\sqrt{6} + 2\sqrt{15} + 2\sqrt{10} \\ &= 10 + 2\sqrt{6} + 2\sqrt{15} + 2\sqrt{10} \end{aligned}$$

1. $\sqrt{14+2\sqrt{15}+2\sqrt{30}+2\sqrt{18}}$

X (a) $\sqrt{2}+\sqrt{3}+\sqrt{6}$

X (b) $\sqrt{2}+\sqrt{3}+\sqrt{7}$

✓ (c) $\sqrt{3}+\sqrt{5}+\sqrt{6}$

X (d) $\sqrt{5}+\sqrt{6}+\sqrt{7}$

m-1

42. Evaluate

$$(\sqrt{6} + \sqrt{10} - \sqrt{21} - \sqrt{35})(\sqrt{6} - \sqrt{10} + \sqrt{21} - \sqrt{35})$$

मूल्यांकन करे

$$(\sqrt{6} + \sqrt{10} - \sqrt{21} - \sqrt{35})(\sqrt{6} - \sqrt{10} + \sqrt{21} - \sqrt{35})$$

(a) 13

(b) 12

(c) 11

(d) 10

$$= 6 - \cancel{\sqrt{60}} + \cancel{\sqrt{126}} - \cancel{\sqrt{210}} + \cancel{\sqrt{60}} - 10 + \cancel{\sqrt{210}} - \cancel{\sqrt{350}} - \cancel{\sqrt{126}} + \cancel{\sqrt{210}} - 21 + \cancel{\sqrt{735}} - \cancel{\sqrt{210}} + \cancel{\sqrt{350}} - \cancel{\sqrt{735}} + 35$$

$$= 6 - 10 - 21 + 35$$

$$= 4 - 31$$

$$= 10$$

42. Evaluate

$$= \frac{m-2}{\left[\underbrace{(\sqrt{6}-\sqrt{35})}_p + \underbrace{(\sqrt{10}-\sqrt{21})}_q \right] \left[\underbrace{(\sqrt{6}-\sqrt{35})}_p - \underbrace{(\sqrt{10}-\sqrt{21})}_q \right]}$$

$$= [\sqrt{6}-\sqrt{35}]^2 - [\sqrt{10}-\sqrt{21}]^2$$

$$= (6+35-2\sqrt{210}) - (10+21-2\sqrt{210})$$

$$= 41 - 2\sqrt{210} - 31 + 2\sqrt{210}$$

$$= \underline{10}$$

$$(\sqrt{6} + \sqrt{10} - \sqrt{21} - \sqrt{35})(\sqrt{6} - \sqrt{10} + \sqrt{21} - \sqrt{35})$$

मूल्यांकन करे

$$(\sqrt{6} + \sqrt{10} - \sqrt{21} - \sqrt{35})(\sqrt{6} - \sqrt{10} + \sqrt{21} - \sqrt{35})$$

(a) 13

(b) 12

(c) 11

(d) 10

$$\begin{aligned} (a+b)(a-b) &= a^2 - b^2 \\ (a+b-c-d)(a-b+c-d) \\ &= [(a-d)+(b-c)][(a-d)-(b-c)] \\ (p+q)(p-q) &= p^2 - q^2 \end{aligned}$$

43. What is the value

$$(x)^3 = \left[\sqrt[3]{26 + 15\sqrt{3}} + \sqrt[3]{26 - 15\sqrt{3}} \right]^3$$

$$x^3 = \cancel{26 + 15\sqrt{3}} + \cancel{26 - 15\sqrt{3}} + 3 \times 1 \times x$$

$$\therefore x^3 = 52 + 3x$$

$$x=4 \quad 64 = 52 + 12$$

$$x = \sqrt[3]{26 + 15\sqrt{3}} + \sqrt[3]{26 - 15\sqrt{3}} = ?$$

~~$\sqrt[3]{26 + 15\sqrt{3}} + \sqrt[3]{26 - 15\sqrt{3}}$~~ का मान क्या है?

(a) 6

(b) 5

(c) 4

(d) 3

$$(a+b)^3 = \underline{a^3} + \underline{b^3} + 3ab(\underline{a+b})$$

TYPE - 03

**IF SQUARE ROOT IS IN
THE DENOMINATOR**

$$\begin{aligned} & \sqrt{\frac{(\sqrt{3}+\sqrt{2}) \times (\sqrt{3}+\sqrt{2})}{\sqrt{3}-\sqrt{2} (\sqrt{3}+\sqrt{2})}} \\ &= \sqrt{\frac{(\sqrt{3}+\sqrt{2})^2}{(3-2)}} \\ &= \frac{(\sqrt{3}+\sqrt{2})}{1} \end{aligned}$$

44. The square root of $\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ is

$\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ का वर्गमूल है

- (a) ☒ $\sqrt{3} + \sqrt{2}$
 (c) $\sqrt{2} \times \sqrt{3}$

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

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

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

$$\begin{aligned}
 & 2 + \frac{6 \times \sqrt{3}}{\sqrt{3} \sqrt{3}} + \frac{2 - \sqrt{3}}{1} + \frac{\sqrt{3} + 2}{-1} \quad 45. \\
 & = 2 + \frac{6\sqrt{3}}{3} + \cancel{2} - \sqrt{3} - \sqrt{3} - \cancel{2} \\
 & = 2 + \cancel{2\sqrt{3}} - \cancel{2\sqrt{3}}
 \end{aligned}$$

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

$$2 + \frac{6}{\sqrt{3}} + \frac{1}{2 + \sqrt{3}} + \frac{1}{\sqrt{3} - 2} \text{ बराबर है}$$

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

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

(c) 1

☒ (d) 2

$$3 - 4 = -1$$

$$\left[\frac{3\sqrt{2} \times (\sqrt{6} - \sqrt{3})}{3} \right] - \left[\frac{2\sqrt{6}(\sqrt{3} - 1)}{2} \right] + \frac{2\sqrt{3}(\sqrt{6} - 2)}{2} \quad 46.$$

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

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

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

$$\frac{3\sqrt{2}}{\sqrt{6} + \sqrt{3}} - \frac{2\sqrt{6}}{\sqrt{3} + 1} + \frac{2\sqrt{3}}{\sqrt{6} + 2} \text{ के बराबर है}$$

(a) 3

(b) 2

(c) 0

(d) $\sqrt{3}$

$$\sqrt{12} = \sqrt{4 \times 3} \\ 2\sqrt{3}$$

$$\begin{aligned}
 & \frac{15(\sqrt{2}+1)}{\sqrt{2}+2+2\sqrt{2}-1-4} \\
 = & \frac{15(\sqrt{2}+1)}{-3+3\sqrt{2}} \\
 = & \frac{5 \cancel{15}(\sqrt{2}+1) \times (\sqrt{2}+1)}{\cancel{3}(\sqrt{2}-1) (\sqrt{2}+1)} \\
 = & \frac{5(\sqrt{2}+1)^2}{2-1} \\
 = & \frac{5}{1}(2+1+2\sqrt{2}) \\
 = & 5(3+2\sqrt{2})
 \end{aligned}$$

47. The expression

$$\frac{15(\sqrt{10} + \sqrt{5})}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}} \text{ is equal to:}$$

$\sqrt{2} + \sqrt{4} + \sqrt{8} - 1 - \sqrt{16}$

व्यंजक $\frac{15(\sqrt{10} + \sqrt{5})}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}}$ के बराबर है

(a) $10(3+2\sqrt{5})$

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

☒ (c) $5(3+2\sqrt{2})$

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

48. 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

P.G.W

$$\frac{3\sqrt{2}}{\sqrt{3} + \sqrt{6}} - \frac{4\sqrt{3}}{\sqrt{6} + \sqrt{2}} + \frac{\sqrt{6}}{\sqrt{3} + \sqrt{2}} \text{ का मान है}$$

(a) 4

(b) 0

(c) $\sqrt{2}$

(d) $3\sqrt{6}$

49.
H.W

The simplified value of

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

$$\frac{3\sqrt{7}}{\sqrt{5} + \sqrt{2}} - \frac{5\sqrt{5}}{\sqrt{2} + \sqrt{7}} + \frac{2\sqrt{2}}{\sqrt{7} + \sqrt{5}} \text{ का सरलीकृत मान है:}$$

(a) 0

(b) 1

(c) 5

(d) 6

$$\frac{4}{\sqrt{6} + \sqrt{2}} = \frac{\cancel{4}(\sqrt{6} - \sqrt{2})}{\cancel{4}}$$

50. $\frac{1}{\sqrt{11 - 2\sqrt{30}}} - \frac{3}{\sqrt{7 - 2\sqrt{10}}} - \frac{4}{\sqrt{8 + 4\sqrt{3}}}$

~~(a) 0~~

(b) 1

(c) $\sqrt{2}$

(d) $\sqrt{5}$

$$= \left(\frac{1}{\sqrt{6} - \sqrt{5}} \right) - \left(\frac{3}{\sqrt{5} - \sqrt{2}} \right) - \frac{4}{\sqrt{8 + 2\sqrt{12}}}$$
$$= \frac{(\sqrt{6} + \sqrt{5})}{1} - \cancel{3} \left(\frac{\sqrt{5} + \sqrt{2}}{\cancel{3}} \right) - (\sqrt{6} - \sqrt{2})$$
$$= \cancel{\sqrt{6}} + \cancel{\sqrt{5}} - \cancel{\sqrt{5}} - \cancel{\sqrt{2}} - \cancel{\sqrt{6}} + \cancel{\sqrt{2}}$$

$$\begin{aligned}\frac{6}{5+4\sqrt{3}} &= \frac{6(5-4\sqrt{3})}{-23} \\ &= \frac{30-24\sqrt{3}}{-23} \\ &= \frac{24\sqrt{3}-30}{23}\end{aligned}$$

51. What is the simplified value of $\frac{6}{5+4\sqrt{3}}$?

$\frac{6}{5+4\sqrt{3}}$ का सरलीकृत मान क्या है?

✓ (a) $\frac{24\sqrt{3}-30}{23}$

(b) $\frac{13\sqrt{3}-15}{27}$

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

(d) $\frac{15\sqrt{3}-24}{23}$

52. The value of

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

$$\frac{1}{\sqrt{(12 - \sqrt{140})}} - \frac{1}{\sqrt{(8 - \sqrt{60})}} - \frac{2}{\sqrt{10 + \sqrt{84}}} \text{ का मान है}$$

(a) 0

(b) 1

(c) 2

(d) 3

$$= \left(\frac{1}{\sqrt{12 - \sqrt{4 \times 35}}} \right) - \left(\frac{1}{\sqrt{8 - \sqrt{4 \times 15}}} \right) - \frac{2}{\sqrt{10 + \sqrt{4 \times 21}}}$$

$$= \left(\frac{1}{\sqrt{12 - 2\sqrt{35}}} \right) - \left(\frac{1}{\sqrt{8 - 2\sqrt{15}}} \right) - \frac{2}{\sqrt{10 + 2\sqrt{21}}}$$

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

$$= \left(\frac{\sqrt{7} + \sqrt{5}}{2} \right) - \left(\frac{\sqrt{5} + \sqrt{3}}{2} \right) - \frac{2 \times (\sqrt{7} - \sqrt{3})}{4}$$

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

$$\begin{aligned}
 & \frac{1}{(\sqrt{2}-\sqrt{5})+\sqrt{3}} + \frac{1}{(\sqrt{2}-\sqrt{5})-\sqrt{3}} \\
 &= \frac{\sqrt{2}-\sqrt{5}-\cancel{\sqrt{3}} + \sqrt{2}-\sqrt{5}+\cancel{\sqrt{3}}}{(\sqrt{2}-\sqrt{5})^2 - (\sqrt{3})^2} \\
 &= \frac{2\sqrt{2}-2\sqrt{5}}{(2+5-2\sqrt{10})-3} \\
 &= \frac{2(\sqrt{2}-\sqrt{5})}{4-2\sqrt{10}} \\
 &= \frac{\cancel{2}(\sqrt{2}-\sqrt{5})}{\cancel{2}\sqrt{2}(\sqrt{2}-\sqrt{5})} = \left(\frac{1}{\sqrt{2}}\right)
 \end{aligned}$$

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

सरलीकृत रूप से $\left[\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}} \right]$ के बराबर है

(a) 1

(b) $\sqrt{2}$

✓ (c) $\frac{1}{\sqrt{2}}$

(d) 0

$$\begin{aligned}
 & \frac{1}{x} + \frac{1}{y} \\
 &= \frac{y+x}{xy}
 \end{aligned}$$

Q.54 $\frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}}$

Ans $\frac{1}{\sqrt{4}+\sqrt{3}} + \frac{1}{\sqrt{5}+\sqrt{4}} + \frac{1}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{7}+\sqrt{6}}$

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

$= \boxed{\sqrt{7}-\sqrt{3}}$

(a) $\sqrt{3}-\sqrt{7}$

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

✓ (c) $\sqrt{7}-\sqrt{3}$

(d) $\sqrt{8}-\sqrt{5}$

Q.54 $\frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}}$

Ans $\frac{1}{\sqrt{4}+\sqrt{3}} + \frac{1}{\sqrt{5}+\sqrt{4}} + \frac{1}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{7}+\sqrt{6}}$

$= \cancel{\sqrt{4}} - \sqrt{3} + \sqrt{5} - \cancel{\sqrt{4}} + \dots + \sqrt{7} - \cancel{\sqrt{6}}$

$= \sqrt{7} - \sqrt{3}$

(a) $\sqrt{3} - \sqrt{7}$

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

☒ (c) $\sqrt{7} - \sqrt{3}$

(d) $\sqrt{8} - \sqrt{5}$

$$\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \dots + \frac{1}{\sqrt{100}+\sqrt{99}}$$

55. The value of $\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \dots +$

$$= (\cancel{\sqrt{2}}-1) + (\cancel{\sqrt{3}}-\cancel{\sqrt{2}}) + \dots + (\cancel{\sqrt{100}}-\cancel{\sqrt{99}}) \frac{1}{\sqrt{100}+\sqrt{99}} \text{ is}$$

$$= \sqrt{100} - 1$$

$$= 10 - 1 = 9$$

$$\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \dots + \frac{1}{\sqrt{100}+\sqrt{99}} \text{ का}$$

मान है

(a) 1

(c) $\sqrt{99}$

☒ (b) 9

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

$$(\sqrt{100} + \sqrt{99}) - (\sqrt{99} + \sqrt{98}) + (\sqrt{98} + \sqrt{97}) - \dots$$

$$\dots + (\sqrt{2} + 1)$$

$$= \sqrt{100} + \cancel{\sqrt{99}} - \cancel{\sqrt{99}} - \sqrt{98} + \dots + \sqrt{2} + 1$$

$$= \sqrt{100} + 1$$

$$= 10 + 1 = 11$$

56.

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

$$\frac{1}{\sqrt{98} - \sqrt{97}} - \frac{1}{\sqrt{97} - \sqrt{96}} + \dots + \frac{1}{\sqrt{2} - \sqrt{1}}$$

सरल कीजिए।

(a) 0

(c) 10

(b) 9

☒ (d) 11

57. The value of $\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \dots + \frac{1}{\sqrt{9}+\sqrt{8}}$

$= \cancel{(\sqrt{2}-1)} + \cancel{(\sqrt{3}-\sqrt{2})} + \dots + \cancel{(\sqrt{9}-\sqrt{8})}$

$= \sqrt{9} - 1 = 3 - 1 = 2$

$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{8}+\sqrt{9}}$ is

का मान है

(a) 1

(b) 0

☒ (c) 2

(d) $\sqrt{2}$

58. The value of $\frac{1}{\sqrt{3.25} + \sqrt{2.25}} + \frac{1}{\sqrt{4.25} + \sqrt{3.25}}$

$$(\sqrt{3.25} - \sqrt{2.25}) + (\sqrt{4.25} - \sqrt{3.25}) + (\sqrt{6.25} - \sqrt{5.25})$$

$$+ \frac{1}{\sqrt{5.25} + \sqrt{4.25}} + \frac{1}{\sqrt{6.25} + \sqrt{5.25}} \text{ is}$$

$$= \sqrt{6.25} - \sqrt{2.25}$$

$$= 2.5 - 1.5$$

$$= \textcircled{1}$$

का मान है

(a) 1.00

(b) 1.25

(c) 1.50

(d) 2.25

$$\begin{aligned}
 & (\sqrt{16} + \sqrt{15}) - (\sqrt{15} + \sqrt{14}) + (\sqrt{14} + \sqrt{13}) \\
 & \quad + \dots - (\sqrt{9} + \sqrt{8}) \\
 & = \cancel{\sqrt{16}} + \cancel{\sqrt{15}} - \cancel{\sqrt{15}} - \cancel{\sqrt{14}} + \cancel{\sqrt{14}} + \sqrt{13} + \dots - \cancel{\sqrt{9}} - \sqrt{8} \\
 & = \sqrt{16} - \sqrt{8} \\
 & = 4 - 2\sqrt{2}
 \end{aligned}$$

59. The value of

$$\begin{aligned}
 & \frac{1}{4 - \sqrt{15}} - \frac{1}{\sqrt{15} - \sqrt{14}} + \frac{1}{\sqrt{14} - \sqrt{13}} - \frac{1}{\sqrt{13} - \sqrt{12}} + \\
 & \frac{1}{\sqrt{12} - \sqrt{11}} - \frac{1}{\sqrt{11} - \sqrt{10}} + \frac{1}{\sqrt{10} - 3} - \frac{1}{3 - \sqrt{8}} \text{ is:} \\
 & \frac{1}{\sqrt{16} - \sqrt{15}} - \frac{1}{\sqrt{15} - \sqrt{14}} + \frac{1}{\sqrt{14} - \sqrt{13}} - \frac{1}{\sqrt{13} - \sqrt{12}} + \\
 & \frac{1}{\sqrt{12} - \sqrt{11}} - \frac{1}{\sqrt{11} - \sqrt{10}} + \frac{1}{\sqrt{10} - 3} - \frac{1}{\sqrt{9} - \sqrt{8}} \text{ का} \\
 & \text{मान ज्ञात करें।}
 \end{aligned}$$

SSC CGL MAINS 29 Jan 2022

(a) $2 + 2\sqrt{2}$

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

✓ (c) $4 - 2\sqrt{2}$

(d) $4 + 2\sqrt{2}$

$$= \frac{\sqrt{26} - \sqrt{147}}{\sqrt{14} + \sqrt{75}}$$

$$= \frac{\sqrt{52} - 2\sqrt{147}}{\sqrt{28} + 2\sqrt{75}}$$

$$= \frac{\sqrt{49} - \sqrt{3}}{\sqrt{25} + \sqrt{3}} = \frac{(7-\sqrt{3}) \times (5-\sqrt{3})}{(5+\sqrt{3})(5-\sqrt{3})}$$

$$= \frac{35 - 7\sqrt{3} - 5\sqrt{3} + 3}{22}$$

$$= \frac{38 - 12\sqrt{3}}{22}$$

$$\Rightarrow \frac{19 - 6\sqrt{3}}{11} = \frac{b + a\sqrt{3}}{11}$$

60. If $\frac{\sqrt{26 - 7\sqrt{3}}}{\sqrt{14 + 5\sqrt{3}}} = \frac{b + a\sqrt{3}}{11}$ $b > 0$, then what is the value of $\sqrt{(b - a)}$?

यदि $\frac{\sqrt{26 - 7\sqrt{3}}}{\sqrt{14 + 5\sqrt{3}}} = \frac{b + a\sqrt{3}}{11}$ $b > 0$ हो, तो $\sqrt{(b - a)}$ का मान कितना होगा?

SSC CGL MAINS 03 Feb 2022

(a) 5

(b) 25

(c) 12

(d) 9

$$b = 19$$

$$a = -6$$

$$\sqrt{19 - (-6)} = \sqrt{19 + 6} = 5$$

61. $\frac{\sqrt{38 - 5\sqrt{3}}}{\sqrt{26 + 7\sqrt{3}}} = \frac{a + b\sqrt{3}}{23}$, $b > 0$, then the value of $(b - a)$ is:

यदि $\frac{\sqrt{38 - 5\sqrt{3}}}{\sqrt{26 + 7\sqrt{3}}} = \frac{a + b\sqrt{3}}{23}$, $b > 0$ है, तो $(b - a)$ का मान कितना होगा?

SSC CGL MAINS 03 Feb 2022

(a) 7

(b) 18

☒ (c) 29

(d) 11

$$\frac{(\sqrt{3} + \sqrt{2}) - (\sqrt{3} - \sqrt{2})}{(12\sqrt{6} + 48 - 30 - 20\sqrt{6})}$$

$$= \frac{\cancel{\sqrt{3}} + \sqrt{2} - \cancel{\sqrt{3}} + \sqrt{2}}{18 - 8\sqrt{6}}$$

$$= \frac{\cancel{18} \sqrt{2}}{\cancel{18} - \cancel{8} \sqrt{6}} = \frac{\sqrt{2}}{9 - 4\sqrt{6}}$$

$$a = -\frac{9}{15} \quad b = -\frac{8}{15}$$

$$a - b = -\frac{9}{15} + \frac{8}{15} = -\frac{1}{15}$$

$$= \frac{\sqrt{2}(9 + 4\sqrt{6})}{-15}$$

$$= -\frac{9}{15}\sqrt{2} - \frac{4}{15}\sqrt{12}$$

$$= -\frac{9}{15}\sqrt{2} - \frac{8}{15}\sqrt{3}$$

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

62. If $\frac{\sqrt{5+2\sqrt{6}} - \sqrt{5-2\sqrt{6}}}{(4\sqrt{3} - 5\sqrt{2}) \times (3\sqrt{2} + 4\sqrt{3})} = a\sqrt{2} + b\sqrt{3}$, then

the value of $(a - b)$ is:

यदि $\frac{\sqrt{5+2\sqrt{6}} - \sqrt{5-2\sqrt{6}}}{(4\sqrt{3} - 5\sqrt{2}) \times (3\sqrt{2} + 4\sqrt{3})} = a\sqrt{2} + b\sqrt{3}$, तो $(a$

$- b)$ का मान है:

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

(c) $\frac{1}{15}$

$4\sqrt{12}$
 $4 \times 2\sqrt{3}$
 $8\sqrt{3}$

(b) $-\frac{1}{15}$

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

$$\frac{\sqrt{3}}{(\sqrt{3}+\sqrt{2})} \times \frac{1}{\sqrt{2}} = a+b\sqrt{6}$$

$$\Rightarrow \frac{\sqrt{3}(\sqrt{3}-\sqrt{2})}{1} = a+b\sqrt{6}$$

$$\Rightarrow 3 - \sqrt{6} = a + b\sqrt{6}$$

$a=3$ $b\sqrt{6} = -\sqrt{6} \Rightarrow b=-1$

$$\begin{aligned} \therefore 4a-3b &= 4 \times 3 - 3 \times (-1) \\ &= 12+3 \\ &= 15 \end{aligned}$$

63.

If $\frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}} \times \left(\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}} \right) = a + b\sqrt{6}$ where a and b are positive integers, then what will be the value of $(4a - 3b)$?

$$\text{यदि } \frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}} \times \left(\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}} \right) = a + b\sqrt{6}$$

+ $b\sqrt{6}$ जहाँ a और b पॉजिटिव पूर्णाकों (इंटीजर) हैं, तो $(4a - 3b)$ का मूल्य क्या होगा?

(a) 9

(c) 10

(b) 15

(d) 12

$$\frac{\cancel{8}\sqrt{5}(\sqrt{10}+\sqrt{2})}{\cancel{8}} - \frac{\cancel{5}\sqrt{2}(\sqrt{10}+\sqrt{5})}{\cancel{5}}$$

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

$= \cancel{\sqrt{50}} + \cancel{\sqrt{10}} - \cancel{\sqrt{20}} - \cancel{\sqrt{10}} + \cancel{\sqrt{20}} + \sqrt{50} + \frac{(2+\sqrt{2})}{2} + b\sqrt{2}$ है, तो $(15a - 2b)$ का मान बताइए।

$$= 10\sqrt{2} + \frac{(2+\sqrt{2})}{2}$$

$$= \frac{20\sqrt{2} + 2 + \sqrt{2}}{2}$$

$$= \frac{21\sqrt{2} + 2}{2}$$

$$= \frac{21}{2}\sqrt{2} + 1$$

$$b\sqrt{2} + a$$

64. $\frac{8\sqrt{5}}{\sqrt{10}-\sqrt{2}} - \frac{5\sqrt{2}}{\sqrt{10}-\sqrt{5}} - \frac{3\sqrt{10}}{\sqrt{2}-\sqrt{5}} + \frac{1}{2-\sqrt{2}} = a + b\sqrt{2}$ then $(15a - 2b)$ value is equal to

यदि $\frac{8\sqrt{5}}{\sqrt{10}-\sqrt{2}} - \frac{5\sqrt{2}}{\sqrt{10}-\sqrt{5}} - \frac{3\sqrt{10}}{\sqrt{2}-\sqrt{5}} + \frac{1}{2-\sqrt{2}} = a$

(a) 3

(c) 6

☒ (b) -6

(d) -3

$a + b\sqrt{2}$

$\therefore b = \frac{21}{2}$

$a = 1$

$\therefore 15 \times 1 - \cancel{2} \times \frac{21}{2}$
 $= -6$

(m-1) Approximation

65. The value of $5\sqrt{3} + 7\sqrt{2} - \sqrt{6} - \frac{23}{\sqrt{2} + \sqrt{3} + \sqrt{6}}$ is:

$$\begin{aligned}
 & 5 \times 1.732 + 7 \times 1.414 - 2.44 - \frac{23}{1.414 + 1.732 + 2.440} \\
 = & \frac{8.660 + 9.898 - 2.44}{5.586} - \frac{23}{5.586} \\
 = & 16.118 - 4.1 \\
 = & \textcircled{12}
 \end{aligned}$$

$5\sqrt{3} + 7\sqrt{2} - \sqrt{6} - \frac{23}{\sqrt{2} + \sqrt{3} + \sqrt{6}}$ is: का मान ज्ञात कीजिए।

(a) 15

(b) 16

☒ (c) 12

(d) 10

$$\begin{aligned}
 \sqrt{2} &= 1.414 \\
 \sqrt{3} &= 1.732 \\
 \sqrt{4} &= 2 \\
 \sqrt{5} &= 2.236
 \end{aligned}$$

$$\sqrt{6} = 2.44$$

$$\begin{aligned} & \frac{3.146 + 2}{3.146 + 2.440 + 2 \times 1.414 + 4} \\ &= \frac{5.146}{5.586 + 2.828 + 4} \\ &= \frac{5.146}{12.414} \approx 0.41 \end{aligned}$$

66. Solve $\frac{\sqrt{2} + \sqrt{3} + \sqrt{4}}{\sqrt{2} + \sqrt{3} + \sqrt{6} + \sqrt{8} + \sqrt{16}} ?$

$\left\{ \frac{\sqrt{2} + \sqrt{3} + \sqrt{4}}{\sqrt{2} + \sqrt{3} + \sqrt{6} + \sqrt{8} + \sqrt{16}} \right.$ को हल कीजिए?

~~(a)~~ $\sqrt{2} \quad 1.414$

$\checkmark$ (b) $\sqrt{2} - 1 = 0.414$

$\frac{1.414}{3} = 0.471$ (c) $\frac{\sqrt{2}}{3}$

$3 - 1.414 = 1.586$ (d) $3 - \sqrt{2}$

$\sqrt{2} = 1.414$
 $\sqrt{3} = 1.732$
 $\sqrt{5} = 2.236$
 $\sqrt{6} = 2.44$
 $+ 3.146$

$$\begin{aligned}
 & \frac{\sqrt{5-\sqrt{21}}}{\sqrt{32-2(5-\sqrt{21})}-\sqrt{21}} \\
 &= \frac{\sqrt{5-\sqrt{21}}}{\sqrt{22+2\sqrt{21}}-\sqrt{21}} \\
 &= \left(\sqrt{\frac{10-2\sqrt{21}}{2}} \right) \times \frac{1}{\cancel{\sqrt{21}}+1-\cancel{\sqrt{21}}} \\
 &= \frac{\sqrt{7}-\sqrt{3}}{\sqrt{2}}
 \end{aligned}$$

67. If $x = 5 - \sqrt{21}$, then the value of

$$\frac{\sqrt{x}}{\sqrt{32-2x}-\sqrt{21}} \text{ is:}$$

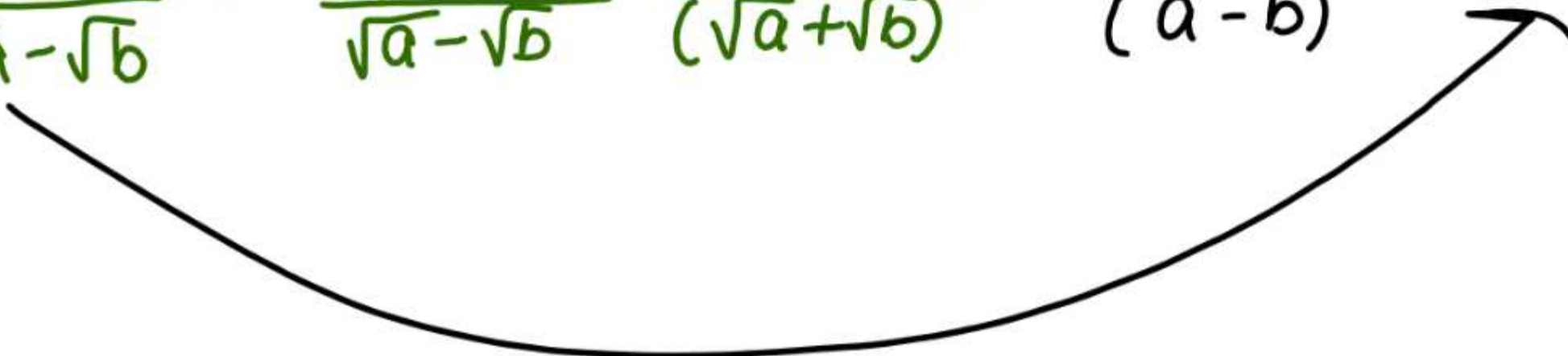
यदि $x = 5 - \sqrt{21}$ तो $\frac{\sqrt{x}}{\sqrt{32-2x}-\sqrt{21}}$ का मान है:

(a) $\frac{1}{\sqrt{2}}(\sqrt{3}-\sqrt{7})$

☒ (b) $\frac{1}{\sqrt{2}}(\sqrt{7}-\sqrt{3})$

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

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

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


$$\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \times \frac{\sqrt{14}-\sqrt{10}}{\sqrt{14}+\sqrt{10}} + \sqrt{2}$$

$$= \frac{\cancel{\sqrt{14}+\sqrt{10}} \times \cancel{\sqrt{14}-\sqrt{10}}}{\cancel{\sqrt{14}-\sqrt{10}} \times \cancel{\sqrt{14}+\sqrt{10}}} + \sqrt{2}$$

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

68. What is the value of $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \div \frac{\sqrt{14}+\sqrt{10}}{\sqrt{14}-\sqrt{10}} +$

$$\frac{\sqrt{10}}{\sqrt{5}} ?$$

$$\left[\frac{\sqrt{a}+\sqrt{b}}{\sqrt{a}-\sqrt{b}} = \frac{(a+b+2\sqrt{ab})}{a-b} \right]$$

$$\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \div \frac{\sqrt{14}+\sqrt{10}}{\sqrt{14}-\sqrt{10}} + \frac{\sqrt{10}}{\sqrt{5}} \text{ का मान क्या है?}$$

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

(b) $2\sqrt{2} + 2$

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

(d) $2\sqrt{2} + 1$

TYPE - 04

**SMALLEST AND
GREATEST VALUE**

$$\begin{array}{l} (a^2)^3 \\ = a^{2 \times 3} \\ = a^6 \end{array} \quad / \quad \begin{array}{l} a^{2^3} \\ = a^{2^3} \\ = a^8 \end{array}$$

69. Which of the following is greatest?

निम्न में से कौन सबसे बड़ा है।

(a) 3^{2^3}

✓ (b) 3^{3^2}

(c) 2^{3^2}

(d) $(2^3)^2$

∴

$$\begin{array}{cccc}
 3^{2^3} & 3^{3^2} & 2^{3^2} & (2^3)^2 \\
 3^8 & 3^9 & 2^9 & 2^6 \\
 & \text{---} & \text{---} & \\
 & 3^9 & &
 \end{array}$$

70. Which of the following is greatest?

Try

निम्न में से कौन सबसे बड़ा है।

(a) 3333

(b) 333^3

(c) 3^{333}

(d) $3^{3^{33}}$

3333

$(300)^3$

27000000

3^{333}

333

3^{27}

3^{27}

$3^1 = 3$

$3^2 = 9$

$3^3 = 27$

$3^4 = 81$

$3^5 = 243$

$3^6 = 729$

70. Which of the following is greatest?

निम्न में से कौन सबसे बड़ा है।

(a) 3333

(b) 333^3

(c) 3^{333}

(d) $3^{3^{3^3}}$

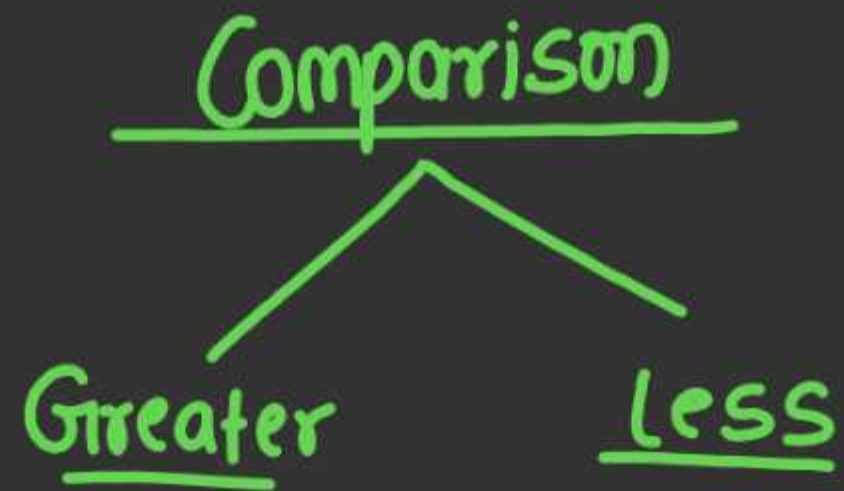
Soln

$$3333 < 333^3 < \approx (300)^3 < 27000000$$

$$3^{333} < \approx (3^3)^{3^3} = 3^{27}$$

$$333 < 3^{27}$$

$3^5(333)(36)$



✓ ~~Q~~ $2^{\frac{1}{12}}, 3^{\frac{1}{6}}, 4^{\frac{1}{3}}$ (LCM)

Q $2^{200}, 3^{100}, 6^{300}$ (HCF)

✓ ~~Q~~ $\sqrt{11} \pm \sqrt{7}, \sqrt{9} \pm \sqrt{9}, \sqrt{12} \pm \sqrt{6}$ (Sum same)

✓ ~~Q~~ $\sqrt{6} \pm \sqrt{4}, \sqrt{8} \pm \sqrt{3}, \sqrt{12} \pm \sqrt{2}$ (product same)

Q Misc

Type-2

$$2^{100} \quad 3^{200} \quad 4^{50}$$

Note power $\rightarrow$ Big $\rightarrow$ HCF

$$\text{HCF}(100, 200, 50) = 50$$

$$\begin{aligned} & (2^2)^{50} \quad (3^4)^{50} \quad (4^1)^{50} \\ = & (4)^{50} \quad (\underline{81})^{50} \quad (4)^{50} \end{aligned}$$

...

$$3^{34} \quad 2^{51} \quad 7^{17}$$

$$\text{HCF}(34, 51, 17) = 17$$

$$(3^2)^{17} \quad (2^3)^{17} \quad (7^1)^{17}$$

$$(9)^{17} \quad (8)^{17} \quad (7)^{17}$$

$$3^{34} > 2^{51} > 7^{17}$$

71. Arranging the following in descending order

$3^{34}, 2^{51}, 7^{17}$ we get ~~अतः~~ ~~अतः~~

निम्नलिखित को ~~आरोही~~ क्रम में व्यवस्थित करना $3^{34}, 2^{51}, 7^{17}$ हम प्राप्त करते हैं

✓ (a) $3^{34} > 2^{51} > 7^{17}$

(c) $3^{34} > 7^{17} > 2^{51}$

(b) $7^{17} > 2^{51} > 3^{34}$

(d) $2^{51} > 3^{34} > 7^{17}$

$$2^{250} \quad 3^{150} \quad 5^{100} \quad 4^{200}$$

72. The smallest among the numbers 2^{250} , 3^{150} , 5^{100} and 4^{200}

$$\text{HCF}(250, 150, 100, 200) = 50$$

2^{250} , 3^{150} , 5^{100} और 4^{200} संख्याओं में सबसे छोटी

$$(2^5)^{50} \quad (3^3)^{50} \quad (5^2)^{50} \quad (4^4)^{50}$$

$$32 \quad 27 \quad 25 \quad 256$$

(a) 4^{200}

(c) 3^{150}

(b) 5^{100}

(d) 2^{250}

$$(22.5)^{27} \quad (7.5)^{54}$$

73. Which of the following is true?

निम्नलिखित में से कौन सा सही है?

$$\text{H.C.F. } (27, 54) = 27$$

$$(22.5)^{27} \quad (7.5^2)^{27}$$

$$22.5 < \underline{56.25}$$

$$(a) \underline{(22.5)^{27}} > \underline{(7.5)^{54}}$$

$$(c) (22.3)^{27} = (7.5)^{54}$$

$$(b) \cancel{(22.5)^{27}} < (7.5)^{54}$$

$$(d) (22.3)^{27} \geq (7.5)^{54}$$

74. Which is the largest among the numbers, $\sqrt{5}$, $3\sqrt{7}$, $4\sqrt{13}$

जो संख्याओं $\sqrt{5}$, $3\sqrt{7}$, $4\sqrt{13}$ में सबसे बड़ी है

(a) $\sqrt{5}$

(b) $3\sqrt{7}$

☒ (c) $4\sqrt{13}$

(d) All are equal

$\sqrt{5}$, $3\sqrt{7}$, $4\sqrt{13}$

(m-1)

$\sqrt{5}$, $\sqrt{9 \times 7}$, $\sqrt{16 \times 13}$

$\sqrt{5}$, $\sqrt{63}$, $\sqrt{208}$

m-2

5

9×7

16×13

5

63

208

Type-1

Q. $2^{\frac{1}{12}}, 3^{\frac{1}{6}}, 4^{\frac{1}{3}}, 8^{\frac{1}{4}}$

Note:- power $\rightarrow$ fractions $\rightarrow$ LCM

$$\text{LCM}(12, 6, 3, 4) = 12$$

$$2^{\frac{1}{12} \times 12} \quad 3^{\frac{1}{6} \times 12} \quad 4^{\frac{1}{3} \times 12} \quad 8^{\frac{1}{4} \times 12}$$

$$= 2^1 < 3^2 < 4^4 < 8^3$$
$$= 2 < 9 < 256 < 512$$

$$\sqrt{17} < \sqrt[5]{125}$$

$$6^{\frac{1}{3}}, 5^{\frac{1}{2}}, 12^{\frac{1}{6}}$$

$$\text{LCM}(3, 2, 6) = 6$$

$$6^{\frac{1 \times 6}{3}}, 5^{\frac{1 \times 6}{2}}, 12^{\frac{1 \times 6}{6}}$$

$$6^2, 5^3, 12^1$$

$$36, 125, 12$$

75. Which one among $\sqrt[3]{6}$, $\sqrt[2]{5}$ and $\sqrt[6]{12}$ is the largest?

$\sqrt[3]{6}$, $\sqrt[2]{5}$ और $\sqrt[6]{12}$ में से कौन सबसे बड़ा है?

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

(c) $\sqrt[6]{12}$

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

(d) All are equal

$$8^{\frac{1}{2}}, 13^{\frac{1}{4}}, 16^{\frac{1}{5}}, 41^{\frac{1}{10}}$$

$$\text{LCM}(2, 4, 5, 10) = 20$$

$$8^{\frac{1}{2} \times 20}, 13^{\frac{1}{4} \times 20}, 16^{\frac{1}{5} \times 20}, 41^{\frac{1}{10} \times 20}$$

$$\checkmark 8^{10}, \cancel{13^5}, \cancel{16^4}, \cancel{41^2}$$

$$8^{10} = 2^{3 \times 10} \quad 16^5 = 2^{4 \times 5}$$

76. The greatest among the numbers

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

$\sqrt[2]{8}, \sqrt[4]{13}, \sqrt[5]{16}, \sqrt[10]{41}$ में सबसे बड़ी संख्या है:

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

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

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

☒ (d) $\sqrt[2]{8}$

$$= 8^{10} = 2^{3 \times 10} \quad 16^4 = 2^{4 \times 4}$$

$$\sqrt{5} \quad \sqrt[3]{11} \quad 2\sqrt[6]{3}$$

$$5^{\frac{1}{2}} \quad 11^{\frac{1}{3}} \quad 2^{\frac{1}{2}}(3)^{\frac{1}{6}}$$

$$5^{\frac{1}{2} \times 6^3} \quad 11^{\frac{1}{3} \times 6^2} \quad 2^{1 \times 6} \cdot 3^{\frac{1}{6} \times 6}$$

$$5^3 \quad 11^2 \quad 2^6 \cdot 3^1$$

$$125 \quad 121 \quad 192$$

$$\sqrt[3]{11} \quad \sqrt{5} \quad 2\sqrt[6]{3}$$

77. Which shows the correct ascending order of the given value?

कौन -सा दिए गए मानों को सही बढ़ते हुए क्रम में सही दर्शाता है?

DOE PRT 11/11/2019 (Shift- 03)

(a) $\sqrt{5}, \sqrt[3]{11}, 2\sqrt[6]{3}$

(b) $\sqrt{5}, 2\sqrt[6]{3}, \sqrt[3]{11}$

(c) $\sqrt[3]{11}, \sqrt{5}, 2\sqrt[6]{3}$

(d) $2\sqrt[6]{3}, \sqrt{5}, \sqrt[3]{11}$

$$\begin{array}{cccc}
 4^{\frac{1}{3}} & 2^{\frac{1}{2}} & 3^{\frac{1}{6}} & 5^{\frac{1}{4}} \\
 4^{\frac{1 \times 4}{3 \times 4}} & 2^{\frac{1 \times 6}{2 \times 6}} & 3^{\frac{1 \times 2}{6 \times 2}} & 5^{\frac{1 \times 3}{4 \times 3}} \\
 4^4 & 2^6 & 3^2 & 5^3 \\
 256 & 64 & 9 & 125
 \end{array}$$

78. Arranging the following in descending order,

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

निम्नलिखित को अवरोही क्रम में व्यवस्थित करने पर, हमें $\sqrt[3]{4}$, $\sqrt{2}$, $\sqrt[6]{3}$, $\sqrt[4]{5}$ प्राप्त होता है

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

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

79.

H.W

The greatest of the number

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

 $\sqrt[2]{8}, \sqrt[4]{13}, \sqrt[5]{16}, \sqrt[10]{41}$ की सबसे बड़ी संख्या

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

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

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

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

80.

H.W

Which one correctly represents the given values in descending order?

कौन सा दिए गए मानों को घटते हुए क्रम में सही दर्शाता है?

DOE PRT 11/11/2019 (Shift- 02)

(a) $^{12}\sqrt{25}, ^6\sqrt{10}, ^4\sqrt{3}$

(b) $^4\sqrt{3}, ^{12}\sqrt{25}, ^6\sqrt{10}$

(c) $^6\sqrt{10}, ^{12}\sqrt{25}, ^4\sqrt{3}$

(d) $^6\sqrt{10}, ^4\sqrt{3}, ^{12}\sqrt{25}$

$\sqrt{0.09}$ $\sqrt[3]{0.064}$ 0.5 $\frac{3}{5}$ 81. The greatest among the numbers
 $= 0.3$ 0.4 0.5 0.6 $\sqrt{0.09}$, $\sqrt[3]{0.064}$, 0.5 and $\frac{3}{5}$ is

$\sqrt{0.09}$, $\sqrt[3]{0.064}$, 0.5 और $\frac{3}{5}$ में से सबसे बड़ी संख्या है

(a) $\sqrt{0.09}$

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

(c) 0.5

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

$$Q. (\sqrt{7}-\sqrt{6}) \quad (\sqrt{6}-\sqrt{5}) \quad (\sqrt{5}-\sqrt{4})$$

Ans

$$(\sqrt{4}-\sqrt{3}) < (\sqrt{3}-\sqrt{2}) < (\sqrt{2}-1)$$

$$\Rightarrow (2-1.732) \quad (1.732-1.414) \quad (1.414-1)$$
$$0.268 < 0.318 < 0.414$$

Q. $(\sqrt{2001} - \sqrt{1999}) < (\sqrt{1997} - \sqrt{1995}) < (\sqrt{999} - \sqrt{997})$

Note:- $(\sqrt{4}-\sqrt{3})$ $(\sqrt{3}-\sqrt{2})$ $(\sqrt{2}-\sqrt{1})$

Conditions

(i) Gap same

(ii) $\ominus$

Conclusions

सबसे छोटी value सबसे बड़ी संख्या है।

82. Arranging $a = \sqrt{6} - \sqrt{5}$, $b = \sqrt{5} - \sqrt{4}$, $c = \sqrt{4} - \sqrt{3}$ in ascending order, we get.

$a = \sqrt{6} - \sqrt{5}$, $b = \sqrt{5} - \sqrt{4}$, $c = \sqrt{4} - \sqrt{3}$ को आरोही क्रम में रखने पर, हम पाते हैं।

(a) $c < b < a$

(b) $b < a < c$

(c) $a < c < b$

(d) $a < b < c$

$a < b < c$

83. The greatest among $\sqrt{7} - \sqrt{5}$, $\sqrt{5} - \sqrt{3}$, $\sqrt{9} - \sqrt{7}$, $\sqrt{11} - \sqrt{9}$ is

$\sqrt{7} - \sqrt{5}$, $\sqrt{5} - \sqrt{3}$, $\sqrt{9} - \sqrt{7}$, $\sqrt{11} - \sqrt{9}$ में सबसे बड़ा है

(a) $\sqrt{7} - \sqrt{5}$

(c) $\sqrt{9} - \sqrt{7}$

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

(d) $\sqrt{11} - \sqrt{9}$

Greatest = $\sqrt{5} - \sqrt{3}$

Smallest = $\sqrt{11} - \sqrt{9}$

largest = $\sqrt{5} - \sqrt{3}$

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

$(\sqrt{19} - \sqrt{17})$, $(\sqrt{13} - \sqrt{11})$, $(\sqrt{7} - \sqrt{5})$ और $(\sqrt{5} - \sqrt{3})$ में सबसे बड़ा कौन है?

(a) $\sqrt{19} - \sqrt{17}$

(b) $\sqrt{13} - \sqrt{11}$

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

☒ (d) $\sqrt{5} - \sqrt{3}$

$$\begin{aligned}
 & (\sqrt{13} - \sqrt{7})^2 \\
 &= 13 + 7 - 2\sqrt{91} \\
 &= 20 - 2\sqrt{91} \\
 &\approx 20 - 2 \times 9.5 \\
 &\approx 20 - 19 \\
 &\approx 1
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{17} - \sqrt{14})^2 \quad 85. \\
 &= 17 + 14 - 2\sqrt{17 \times 14} \\
 &= 31 - 2\sqrt{238} \\
 &\approx 31 - 2 \times 15.5 \\
 &\approx 31 - 31 \\
 &\approx 0
 \end{aligned}$$

Which of the following is true?

निम्नलिखित में से कौन सा सही है?

(a) $\sqrt{13} - \sqrt{7} \leq \sqrt{17} - \sqrt{14}$

(b) $\sqrt{13} - \sqrt{7} = \sqrt{17} - \sqrt{14}$

(c) $\sqrt{13} - \sqrt{7} < \sqrt{17} - \sqrt{14}$

✓ (d) $\sqrt{13} - \sqrt{7} > \sqrt{17} - \sqrt{14}$

Q. $(\sqrt{7}+\sqrt{3}), (\sqrt{6}+\sqrt{4}), (\sqrt{8}+\sqrt{2}), (\sqrt{5}+\sqrt{5})$

Ans

$$(\sqrt{7}+\sqrt{3})^2 = 10 + 2\sqrt{21} \quad \textcircled{iii}$$

$$(\sqrt{6}+\sqrt{4})^2 = 10 + 2\sqrt{24} \quad \textcircled{ii}$$

$$(\sqrt{8}+\sqrt{2})^2 = 10 + 2\sqrt{16} \quad \textcircled{iv}$$

$$(\sqrt{5}+\sqrt{5})^2 = 10 + 2\sqrt{25} \quad \textcircled{i}$$

$$(\sqrt{5}+\sqrt{5}) > (\sqrt{6}+\sqrt{4}) > (\sqrt{7}+\sqrt{3}) > (\sqrt{8}+\sqrt{2})$$

$$a+b=8$$

$$1+7$$

$$2+6$$

$$3+5$$

$$\underline{4+4}$$

$$ab=\max^m$$

$$7$$

$$12$$

$$15$$

$$16$$

Q. $(\sqrt{7}+\sqrt{3})$, $(\sqrt{6}+\sqrt{4})$, $(\sqrt{8}+\sqrt{2})$, $(\sqrt{5}+\sqrt{5})$
_{4 2 6 0}

Ans

$$(\sqrt{5}+\sqrt{5}) > (\sqrt{6}+\sqrt{4}) > (\sqrt{7}+\sqrt{3}) > (\sqrt{8}+\sqrt{2})$$

Gap ↓ No. ↑

$$① \quad (\sqrt{2001} + \sqrt{2003}) > (\sqrt{1999} + \sqrt{2005}) > (\sqrt{1990} \sqrt{2014})$$

②
⑥
②4

86. Choose the incorrect reaction(s) from the following:

निम्नलिखित में से गलत प्रतिक्रिया चुनें:

(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) (ii) and (iii)

(b) (i)

(c) (ii)

☒ (d) (i) and (iii)

$$\sqrt{6} + \sqrt{2} < \sqrt{5} + \sqrt{3}$$

Handwritten note: A bracket under $\sqrt{6} + \sqrt{2}$ is labeled '4' and a bracket under $\sqrt{5} + \sqrt{3}$ is labeled '2'.

87. Which value among $\sqrt{11} + \sqrt{5}$, $\sqrt{14} + \sqrt{2}$, $\sqrt{8} + \sqrt{8}$, is the largest?

$\sqrt{11} + \sqrt{5}$, $\sqrt{14} + \sqrt{2}$, $\sqrt{8} + \sqrt{8}$ में से कौन सा मान सबसे बड़ा है:

(a) $\sqrt{11} + \sqrt{5}$

(b) $\sqrt{14} + \sqrt{2}$

☒ (c) $\sqrt{8} + \sqrt{8}$

(d) All are equal

88. Which one among $\sqrt{10} + \sqrt{4}$, $\sqrt{11} + \sqrt{3}$, $\sqrt{7} + \sqrt{7}$ is the smallest number?

$\sqrt{10} + \sqrt{4}$, $\sqrt{11} + \sqrt{3}$, $\sqrt{7} + \sqrt{7}$ में से सबसे छोटी संख्या कौन सी है:

(a) $\sqrt{10} + \sqrt{4}$

(c) $\sqrt{7} + \sqrt{7}$

(b) $\sqrt{11} + \sqrt{3}$

(d) All are equal

89. Which of the following statements(s) is/are true?

निम्नलिखित में से कौन सा/से कथन सत्य है/हैं?

I. ✓ $\sqrt{11} + \sqrt{7} < \sqrt{10} + \sqrt{8}$

(Handwritten: 4 over 11, 2 over 7, 2 over 10, 2 over 8)

~~II.~~ $\sqrt{17} + \sqrt{11} > \sqrt{15} + \sqrt{13}$

(Handwritten: 6 over 17, 2 over 11, 2 over 15, 2 over 13)

(a) ✓ Only I

(b) Only II

(c) Both I and II

(d) Neither I nor II

90. Which of the following statement(s) is/are true?

निम्नलिखित में से कौन सा/से कथन सत्य है/हैं?

I. $\sqrt{5} + \sqrt{5} > \sqrt{7} + \sqrt{3}$

II. $\sqrt{6} + \sqrt{7} > \sqrt{8} + \sqrt{5}$

III. $\sqrt{3} + \sqrt{9} > \sqrt{6} + \sqrt{6}$

(a) Only I

(c) Only II and III

(b) Only I and II

(d) Only I and III

$$y = \sqrt{15} + \sqrt{17} > z = \sqrt{14} + \sqrt{18}$$

2 4

$$y > z$$

91. If $x = \sqrt{11} + \sqrt{20}$, $y = \sqrt{15} + \sqrt{17}$ and $z = \sqrt{14} + \sqrt{18}$. Which of the following holds true?

यदि $x = \sqrt{11} + \sqrt{20}$, $y = \sqrt{15} + \sqrt{17}$ और

$z = \sqrt{14} + \sqrt{18}$. निम्नलिखित में से कौन सा सत्य है?

~~(a)~~ $x < y < z$

~~(b)~~ $y < x < z$

~~(c)~~ $y < z < x$

☒ (d) $x < z < y$

32

32

92. Which is largest among $\sqrt{16} + 2$, $\sqrt{19} + 1$ and $\sqrt{18} + \sqrt{2}$

$\sqrt{16} + 2$, $\sqrt{19} + 1$ तथा $\sqrt{18} + \sqrt{2}$ में से कौन सबसे बड़ा है?

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(a) $\sqrt{19} + 1$

(b) $\sqrt{18} + \sqrt{2}$

(c) All are equal

✓ (d) $\sqrt{16} + 2$

$$\begin{array}{ccc}
 (\sqrt{16} + 2) & (\sqrt{19} + 1) & (\sqrt{18} + \sqrt{2}) \\
 (\sqrt{16} + \sqrt{4}) & (\sqrt{19} + \sqrt{1}) & (\sqrt{18} + \sqrt{2}) \\
 12 & 18 & 16
 \end{array}$$

93. Which one among $\sqrt{12} + \sqrt{3}$, $\sqrt{11} + 2$, $\sqrt{5} + \sqrt{10}$ and $1 + \sqrt{14}$ is the largest?

$\sqrt{12} + \sqrt{3}$, $\sqrt{11} + 2$, $\sqrt{5} + \sqrt{10}$ तथा $1 + \sqrt{14}$ में से कौन सा सबसे बड़ा है?

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

☒ (b) $\sqrt{5} + \sqrt{10}$

(c) $\sqrt{11} + 2$

(d) $1 + \sqrt{14}$

$(\sqrt{12} + \sqrt{3})$

$(\sqrt{11} + 2)$

$(\sqrt{5} + \sqrt{10})$

$(1 + \sqrt{14})$

$(\sqrt{12} + \sqrt{3})$

$(\sqrt{11} + \sqrt{4})$

$(\sqrt{10} + \sqrt{5})$

$(\sqrt{14} + \sqrt{1})$

9

7

5

13

Same Product

①. $(\sqrt{12} + \sqrt{2}), (\sqrt{8} + \sqrt{3}), (\sqrt{6} + \sqrt{4})$

Basic $(\sqrt{12} + \sqrt{2})^2 = \checkmark 14 + 2\sqrt{24}$

$$(\sqrt{8} + \sqrt{3})^2 = \checkmark 11 + 2\sqrt{24}$$

$$(\sqrt{6} + \sqrt{4})^2 = \checkmark 10 + 2\sqrt{24}$$

Trick $\rightarrow \checkmark 14, 11, 10$

Big no $\uparrow$

Value $\uparrow$

$$Q. \begin{matrix} (\sqrt{15} + \sqrt{6}) & (\sqrt{10} + \sqrt{9}) & (\sqrt{45} + \sqrt{2}) & (\sqrt{90} + \sqrt{1}) \\ 21 & 19 & 47 & 91 \end{matrix}$$

$$(\sqrt{90} + \sqrt{1}) > (\sqrt{45} + \sqrt{2}) > (\sqrt{15} + \sqrt{6}) > (\sqrt{10} + \sqrt{9})$$

Q $(\sqrt{12}-\sqrt{2})$, $(\sqrt{8}-\sqrt{3})$, $(\sqrt{6}-\sqrt{4})$

Ans

$$(\sqrt{12}-\sqrt{2}) = 14 - 2\sqrt{24} \quad \checkmark$$

$$(\sqrt{8}-\sqrt{3}) = 11 - 2\sqrt{24} \quad \checkmark$$

$$(\sqrt{6}-\sqrt{4}) = 10 - 2\sqrt{24} \quad \checkmark$$

$$Q. \begin{array}{cccc} (\sqrt{10}-\sqrt{9}) & (\sqrt{45}-\sqrt{2}) & (\sqrt{15}-\sqrt{6}) & (\sqrt{90}-\sqrt{1}) \\ 19 & 47 & 21 & 91 \end{array}$$

$$(\sqrt{90}-\sqrt{1}) > (\sqrt{45}-\sqrt{2}) > (\sqrt{15}-\sqrt{6}) > (\sqrt{10}-\sqrt{9})$$

TYPE - 05

SIMPLIFICATION OF POWER

$$x^{\frac{(-\cancel{3}) \times (-\cancel{5}) \times 5}{5}}$$

$$= x^{+\cancel{3}} = x^1$$

94. Simplified form of $\left[\left(\sqrt[5]{x^{-3/5}} \right)^{-5/3} \right]^5$ is

$\left[\left(\sqrt[5]{x^{-3/5}} \right)^{-5/3} \right]^5$ से सरलीकृत है

(a) x^5

(b) x^{-5}

✓ (c) x

(d) $\frac{1}{x}$

$$\begin{aligned}
 & \left\{ 8 - \left[\frac{2^{2 \times \frac{9}{2}}}{2^1} \sqrt{\frac{2 \times 2^2 \times 2^2}{1}} \right]^{\frac{1}{2}} \right\} \quad 95. \\
 &= \left\{ 8 - \left\{ \frac{2^{\frac{9}{2}-1} \times 2^1 \times 2^1 \times \sqrt{2}}{1} \right\}^{\frac{1}{2}} \right\} \\
 &= \left\{ 8 - \left\{ 2^{\frac{9}{2}-1+1+1+\frac{1}{2}} \right\}^{\frac{1}{2}} \right\} \\
 &= \left\{ 8 - \left\{ 2^3 \times \frac{1}{2} \right\} \right\} \\
 &= 8 - 8 \\
 &= 0
 \end{aligned}$$

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

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

(a) 32

(c) 1

(b) 8

(d) 0

$$a^m \times a^n = a^{m+n}$$

$$\begin{aligned}
 A &= (243)^{0.2} \\
 &= 3^{5 \times \frac{1}{5}} \\
 &= \textcircled{3}
 \end{aligned}
 \quad \bigg| \quad
 \begin{aligned}
 B &= \left(\frac{1}{6}\right)^{2 \times \left(\frac{-2}{3}\right)} \div \left(\frac{1}{3}\right)^{3 \times \left(\frac{-4}{3}\right)} \\
 &= \left(\frac{1}{6}\right)^{-2} \div \left(\frac{1}{3}\right)^{-4} \\
 &= \left(\frac{6}{1}\right)^2 \div \left(\frac{3}{1}\right)^4 \\
 &= 36 \div 81 = \frac{36}{81} \textcircled{\frac{4}{9}}
 \end{aligned}$$

$$\frac{B}{A} = \frac{\frac{4}{9}}{\frac{1}{3}} = \frac{4}{3}$$

96. If $A = (243)^{0.12} \times (243)^{0.08}$ and $B = \left(\frac{1}{216}\right)^{-\frac{2}{3}} \div \left(\frac{1}{27}\right)^{-\frac{4}{3}}$ then what is the value of $\frac{B}{A}$?

यदि $A = (243)^{0.12} \times (243)^{0.08}$ और $B = \left(\frac{1}{216}\right)^{-\frac{2}{3}} \div \left(\frac{1}{27}\right)^{-\frac{4}{3}}$ तो $\frac{B}{A}$ का मान क्या है?

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

☒ (b) $\frac{4}{27}$

(c) $\frac{4}{3}$

(d) $\frac{8}{3}$

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

$$= 5^4$$

$$a^m \times a^n = a^{m+n}$$

97. Simplify: $\left[\sqrt[3]{\sqrt[6]{5^9}} \right]^4 \left[\sqrt[3]{\sqrt[6]{5^9}} \right]^4$

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

(a) 5^2

(c) 5^8

✓ (b) 5^4

(d) 5^{12}

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

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

(a) 32

(b) 8

(c) 1

✓ (d) 0

$$\frac{32^{0.20}}{2^{0.250} \times 2^{0.150} \times 2^{0.600}}$$

$$= \frac{2^{\cancel{5} \times \frac{1}{\cancel{5}}}}{2^1} = \frac{2}{2} = 1$$

99. Solve: $\frac{(32^{0.13} \times 32^{0.07})}{(2^{0.25} \times 4^{0.075} \times 8^{0.2})}$

हल करे $\frac{(32^{0.13} \times 32^{0.07})}{(2^{0.25} \times 4^{0.075} \times 8^{0.2})}$

(a) 2

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

✓ (c) 1

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

100. The value of

$$= (5)^{25+5.2-27-1.2} \times$$

$$(0.7)^{8+12-20}$$

$$= 5^2 \times (0.7)^0$$

$$= 25 \times 1 = 25$$

$$\frac{(625)^{6.25} \times (25)^{2.6}}{(5^4)^{6.75} \times (\sqrt{5})^{2.4}} \times \frac{(0.49)^4 \times (0.343)^4}{(0.2401)^5} \text{ is:}$$

$$\frac{(5^4)^{6.25} \times (5^2)^{2.6}}{(5^4)^{6.75} \times (5)^{\frac{2.4}{2}}} \times \frac{(0.7^2)^4 \times (0.7^3)^4}{(0.7^4)^5} \text{ का मान है:}$$

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- ✓ (a) 25
(c) 175

- (b) 0.35
(d) 0.25

$$a^0 = 1$$

101. On simplification

$$\frac{(7)^{2 \times \frac{1}{2}} \times (2^9)^{0.25} \times (2^3)^{0.25} \times (3)^{\frac{2 \times 2}{3}}}{(7)^{2 \times \frac{1}{2}} \times (2)^{8 \times (-0.375)} \times (3)^{4 \times 0.5}}$$

$$= \frac{7^1 \times 2^{2.25} \times 2^{0.75} \times 3^4 \times 1}{7^1 \times 2^{-3} \times 3^2 \times 2^8}$$

$$= 2^{2.25+0.75+3-8} \times 3^{4-2}$$

$$= 2^{-2} \times 3^2 = \frac{3^2}{2^2} = \frac{9}{4} = 2.25$$

$$\frac{(49)^{\frac{1}{2}} \times (512)^{0.25} \times (8)^{0.25} \times (729)^{\frac{2}{3}} \div (64)^{\frac{4}{3}}}{(343)^{\frac{1}{3}} \times (256)^{-0.375} \times (81)^{0.5}}$$

reduces to / का न्यूनतमक मान है-

PGT CS (Female) 26/07/2018 (Shift- 01)

- (a) 2.25
(c) 1.5

- (b) 1.25
(d) 2.5

102. If $5\sqrt{5} \times 5^3 \div 5^{-3/2} = 5^{a+2}$, the value of a is:

यदि $5\sqrt{5} \times 5^3 \div 5^{-3/2} = 5^{a+2}$, a का मान है:

(a) 4

(b) 5

(c) 6

(d) 8

$$5^1 \times 5^{\frac{1}{2}} \times 5^3 \times 5^{\frac{3}{2}} = 5^{a+2}$$

$$\Rightarrow 5^{1+\frac{1}{2}+3+\frac{3}{2}} = 5^{a+2}$$

$$\Rightarrow 5^6 = 5^{a+2}$$

$$\Rightarrow 6 = a+2$$

$$\Rightarrow 4 = a$$

$$\begin{aligned} & 4 \div 3^2 \\ &= 4 \times \frac{1}{3^2} \\ &= 4 \times 3^{-2} \end{aligned}$$

$$\frac{2^{2a+12}}{2^{3a-6}} = 2^2$$

$$\therefore 2^{2a+12-3a+6} = 2^2$$

$$2^{-a+18} = 2^2$$

$$\therefore -a+18=2$$

$$\textcircled{16=a}$$

$$\therefore \sqrt{a+9}$$

$$= \textcircled{5}$$

103. If $\frac{3^{a+3} \times 4^{a+6} \times 25^{a+1}}{27^{a-1} \times 8^{a-2} \times 125^{a+4}} = \frac{4}{15^{26}}$, then the value of $\sqrt{a+9}$ is:

यदि $\frac{3^{a+3} \times \textcircled{4^{a+6}} \times 25^{a+1}}{27^{a-1} \times \textcircled{8^{a-2}} \times 125^{a+4}} = \frac{4}{15^{26}}$ है तो $\sqrt{a+9}$ का

मान है:

(a) 4

(b) 6

☒ (c) 5

(d) 8

$$\frac{3^{\cancel{5} \times \frac{n}{\cancel{5}}} \times 3^{2n+1}}{3^{2n} \times 3^{n-1}}$$

$$= 3^{n+2n+1-2n-n+1}$$

$$= 3^2 = \underline{\underline{9}}$$

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

{ $\frac{(243)^{\frac{n}{5}} \times 3^{2n+1}}{9^n \times 3^{n-1}}$ का मान है:

(a) 3

(c) 6

✓ (b) 9

(d) 12

$$\boxed{a^0 = 1}$$

$$\begin{aligned} \therefore a^{1-1} \\ = \frac{\cancel{a^1}}{\cancel{a^1}} = 1 \end{aligned}$$

$$a^{m-n} = \frac{a^m}{a^n}$$

put $n=0$

$$\frac{(243)^0 \times 3^1}{9^0 \times 3^{-1}}$$

$$= \frac{1 \times 3^1 \times 3^1}{1} = 9$$

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

$\frac{(243)^{\frac{n}{5}} \times 3^{2n+1}}{9^n \times 3^{n-1}}$ का मान है:

(a) 3

(c) 6

✓ (b) 9

(d) 12

$$p=2$$

$$\begin{aligned} & \left(\frac{4^{\frac{9}{4}} \times 2^1 \times \sqrt{2}}{2 \times 2^{-\frac{3}{2}}} \right)^{\frac{1}{2}} \\ &= \left(\frac{2^{2 \times \frac{9}{4}} \times 2^1 \times 2^{\frac{1}{2}}}{2^1 \times 2^{-1}} \right)^{\frac{1}{2}} \\ &= \left(2^{\frac{9}{2} + 1 + \frac{1}{2} - 1 + 1} \right)^{\frac{1}{2}} \\ &= 2^{\frac{3}{2} \times \frac{1}{2}} = 16 \end{aligned}$$

105. The simplest value of the expression

$$\left\{ \frac{4^{p+\frac{1}{4}} \times \sqrt{2 \times 2^p}}{2 \times \sqrt{2^{-p}}} \right\}^{\frac{1}{p}} \text{ is:}$$

अभिव्यक्ति का सबसे सरल मान है:

$$\left\{ \frac{4^{p+\frac{1}{4}} \times \sqrt{2 \times 2^p}}{2 \times \sqrt{2^{-p}}} \right\}^{\frac{1}{p}}$$

(a) 4

(c) 4^p $4^2 = 16$

✓ (b) 8

(d) 8^p $8^2 = 64$

106. If $\underline{27^{2x-1}} = \underline{(243)^3}$ then value of x is

यदि $27^{2x-1} = (243)^3$ तो x का मान है।

☒ (a) 3

(b) 6

(c) 7

(d) 9

$$3^{3(2x-1)} = 3^{5 \times 3}$$

$$\Rightarrow \cancel{3}(2x-1) = 5 \times \cancel{3}$$

$$\Rightarrow \cancel{x} = \cancel{6} 3$$

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

यदि $3^{x+y} = 81$ और $81^{x-y} = 3$, तो x का मान है

(a) 42

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

☒ (c) $\frac{17}{8}$

(d) 39

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

$$3^{4(x-y)} = 3^1$$

$$\begin{array}{r}
 x+y = 4 \\
 x-y = \frac{1}{4} \\
 \hline
 2x = 4 + \frac{1}{4} \\
 2x = \frac{17}{4} \\
 x = \frac{17}{8}
 \end{array}$$

108. Find the value of $x + y$ if $2^x = 8^{y+1}$ and $9^y = 3^{x-9}$

$x + y$ का मान ज्ञात कीजिए यदि $2^x = 8^{y+1}$ और $9^y = 3^{x-9}$

(a) 22

(b) 24

(c) 26

(d) 27

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

$$x = 3y + 3$$

$$3^{2y} = 3^{x-9}$$

$$\Rightarrow 2y = x - 9$$

$$\Rightarrow 2y + 9 = x$$

$$3y + 3 = 2y + 9$$

$$y = 6$$

$$\therefore x = 21$$

$$x + y = 27$$

$$3^{2x-y} = 3^{x+y} = 3^{\frac{3}{2}}$$

$$2x-y = x+y = \frac{3}{2}$$

$$\begin{aligned} 2x-y &= \frac{3}{2} \\ x+y &= \frac{3}{2} \end{aligned}$$

$$\frac{2x-y}{x+y} = \frac{3/2}{3/2}$$

$$\begin{aligned} x &= 1 \\ \therefore y &= \frac{3}{2} - 1 = \frac{1}{2} \end{aligned}$$

$$\therefore 3^{x-y} = 3^{1-\frac{1}{2}} = 3^{\frac{1}{2}} = \sqrt{3}$$

109. If $3^{2x-y} = 3^{x+y} = \sqrt{27}$, then the value of 3^{x-y} will be:

यदि $3^{2x-y} = 3^{x+y} = \sqrt{27}$, तब 3^{x-y} का मान होगा:

(a) 3

(b) $\frac{1}{\sqrt{3}}$

✓ (c) $\sqrt{3}$

(d) $\frac{1}{\sqrt{27}}$

$$\begin{aligned} \sqrt{27} &= (27)^{\frac{1}{2}} \\ &= (3^3)^{\frac{1}{2}} \\ &= 3^{\frac{3}{2}} \end{aligned}$$

$$\begin{aligned}
 5^{x-1} + 3^{y+1} &= 9686 \\
 \Rightarrow \frac{5^x}{5} + 3 \cdot 3^y &= 9686 \\
 \Rightarrow 5^x + 15 \cdot 3^y &= 9686 \times 5 \\
 \Rightarrow 13438 + 3^y + 15 \cdot 3^y &= 48430 \\
 \Rightarrow \cancel{16 \cdot 3^y} &= \cancel{34992} \\
 &\quad 2187 \\
 \Rightarrow 3^y &= 3^7 \\
 \Rightarrow y &= 7
 \end{aligned}$$

110. If $5^x - 3^y = 13438$ and $5^{x-1} + 3^{y+1} = 9686$, then $x+y = ?$

यदि $5^x - 3^y = 13438$ और $5^{x-1} + 3^{y+1} = 9686$, तो $x+y = ?$

(a) 9

(b) 11

(c) 13

(d) 15

$$\rightarrow 5^x = 13438 + 3^y$$

$$\therefore 5^x = 13438 + 2187$$

$$5^x = 15625$$

$$5^x = 5^6$$

$$\therefore x = 6$$

$$\therefore x+y = 6+7 = 13$$

111. Solve for x:

$$\begin{aligned}
 3^x - 3^{x-1} &= 486 \\
 \Rightarrow 3^x - \frac{3^x}{3^1} &= 486 \\
 \Rightarrow 3 \times 3^x - 3^x &= 1458 \\
 \Rightarrow 3^x [3-1] &= 1458 \\
 \Rightarrow 3^x \times \cancel{2} &= \frac{1458}{\cancel{2}} \\
 \Rightarrow 3^x &= 729 \\
 \therefore x &= 6
 \end{aligned}$$

$$\begin{aligned}
 3^4 &= 81 \\
 3^5 &= 243 \\
 3^6 &= 729
 \end{aligned}$$

$$3^x - 3^{x-1} = 486$$

x के लिए हल करें:

$$3^x - 3^{x-1} = 486$$

(a) 7

(c) 5

(b) 9

(d) 6

$$3^{a-b} = \frac{3^a}{3^b}$$

By option

$$3^6 - 3^5$$

$$729 - 243$$

$$= \underline{\underline{486}}$$

111. Solve for x:

$$3^x - 3^{x-1} = 486$$

x के लिए हल करें:

$$3^x - 3^{x-1} = 486$$

(a) 7

(c) 5

(b) 9

☒ (d) 6

By option (112)

$$2^{x-1} + 2^{x+1} = 320$$

$$\Rightarrow \frac{2^x}{2} + 2^x \cdot 2 = 320$$

$$\Rightarrow 2^x \left[\frac{1}{2} + 2 \right] = 320$$

$$\Rightarrow 2^x \times \frac{5}{2} = \frac{640}{2}$$

$$\Rightarrow 2^x = 128$$

$$\Rightarrow 2^x = 2^7$$

$$\therefore x = 7$$

$$x = ?$$

(a) 0

(b) 10

(c) 9

☒ (d) 7

By option (112)

$$2^{x-1} + 2^{x+1} = 320$$

$$x = ?$$

$$2^6 + 2^8$$

$$= 64 + 256$$

$$= 320$$

(a) 0

(b) 10

(c) 9

☒ (d) 7

$$2^7 = 128$$

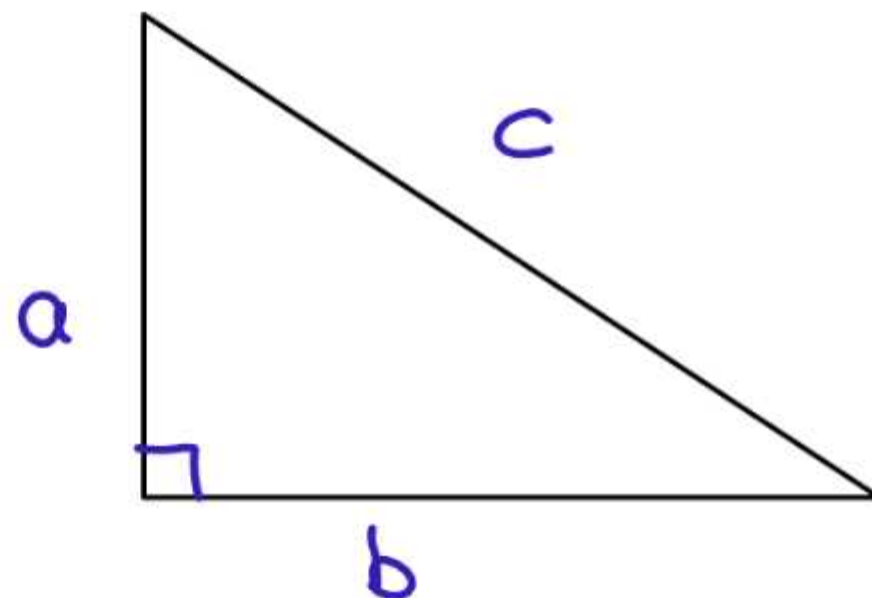
$$a^2 + b^2 = c^2$$

$$5^2 + 12^2 = 13^2$$

$$25 + 144$$

169

169



3, 4, 5
 5, 12, 13
 7, 24, 25
 8, 6, 10
 8, 15, 17
 9, 40, 41

$$\left(\begin{array}{l} 5^{\sqrt{x}} + 12^{\sqrt{x}} = 13^{\sqrt{x}} \\ 5^2 + 12^2 = 13^2 \end{array} \right.$$

$$\therefore \sqrt{x} = 2$$

$$\therefore x = 4$$

113. If $\underline{5}^{\sqrt{x}} + \underline{12}^{\sqrt{x}} = \underline{13}^{\sqrt{x}}$, then x is equal to

यदि $5^{\sqrt{x}} + 12^{\sqrt{x}} = 13^{\sqrt{x}}$, तो x बराबर है

(a) $\frac{25}{4}$

(c) 9

✓ (b) 4

(d) 16

$$x^{x\sqrt{x}} = (x\sqrt{x})^x$$

$$\Rightarrow x^{x\sqrt{x}} = (x^1 \cdot x^{\frac{1}{2}})^x$$

$$\Rightarrow x^{x\sqrt{x}} = (x^{1+\frac{1}{2}})^x$$

$$\Rightarrow x^{x\sqrt{x}} = x^{\frac{3x}{2}}$$

$$x\sqrt{x} = \frac{3x}{2}$$

$$\therefore x = \frac{9}{4}$$

114. If $x^{x\sqrt{x}} = (x\sqrt{x})^x$ then, x equals

यदि $x^{x\sqrt{x}} = (x\sqrt{x})^x$ है, तो x बराबर है

(a) $\frac{4}{9}$

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

(c) $\frac{9}{4}$

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

$$a^m = a^n$$

$$\therefore m = n$$

$$a^m \times a^n = a^{m+n}$$

115. If $2^x + 3^y = 17$ and $2^{x+2} - 3^{y+1} = 5$, then:

यदि $2^x + 3^y = 17$ तथा $2^{x+2} - 3^{y+1} = 5$ है, तो:

SSC CGL TIER- II 07/03/2023

(a) $x = 1, y = 3$

(b) $x = 3, y = 3$

✓ (c) $x = 3, y = 2$

(d) $x = 1, y = 2$

$$\begin{aligned} 2^{x+2} - 3^{y+1} &= 5 \\ \Rightarrow 2^x \cdot 2^2 - 3^y \cdot 3^1 &= 5 \\ \Rightarrow 4 \times 2^x - 3 \times 3^y &= 5 \\ \Rightarrow 4 \times (17 - 3^y) - 3 \times 3^y &= 5 \\ \Rightarrow 68 - 4 \times 3^y - 3 \times 3^y &= 5 \\ \Rightarrow 63 - 7 \times 3^y &= 0 \\ \Rightarrow 963 &= 7 \times 3^y \end{aligned}$$

$$\begin{aligned} \therefore y &= 2 \\ 2^x &= 17 - 3^y \\ &\rightarrow 2^x = 17 - 9 \\ 2^x &= 8 \\ \therefore x &= 3 \end{aligned}$$

115. If $2^x + 3^y = 17$ and $2^{x+2} - 3^{y+1} = 5$, then:

यदि $2^x + 3^y = 17$ तथा $2^{x+2} - 3^{y+1} = 5$ है, तो:

SSC CGL TIER- II 07/03/2023

(a) $x = 1, y = 3$

(b) $x = 3, y = 3$

(c) $x = 3, y = 2$

(d) $x = 1, y = 2$

Use option

(a) $2 + 27 = 29$ ✗

(b) $8 + 27$ ✗

(c) $8 + 9 = 17$ ✓

(d) $2 + 9 = 11$ ✗

116. If $9^{x-\frac{1}{2}} - 2^{2x-2} = 4^x - 3^{2x-3}$, then x is

$$\frac{9-2}{7} = \frac{8-3^0}{7}$$

यदि $9^{x-\frac{1}{2}} - 2^{2x-2} = 4^x - 3^{2x-3}$, तो x है

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

(b) $\frac{2}{5}$

(c) $\frac{3}{4}$

(d) $\frac{4}{9}$

117. If $8^{x+1} - 8^{x-1} = 63$, find x

यदि $8^{x+1} - 8^{x-1} = 63$ है, तो x ज्ञात कीजिए

(a) 0

(c) -1

 (b) 1

(d) 63

option (b)

$$\begin{aligned} & 8^2 - 8^0 \\ &= 64 - 1 \\ &= 63 \end{aligned}$$

$$4^{0.3 \times 2} \cdot 9^{0.2 \times 5} = 8(81)^{\frac{1}{5}}$$

$$2^{2 \times 0.6} \times 9^1 = 8 \times 3^{4 \times \frac{1}{5}}$$

$$2^{1.2} \times 9 = 8 \times 3^{\frac{4}{5}}$$

118. What are the values of x and y that satisfy both the equations?

$$2^{0.7x} \cdot 3^{-1.25y} = 8 \frac{\sqrt{6}}{27} \text{ and } 4^{0.3x} \cdot 9^{0.2y} = 8(81)^{1/5}$$

x और y के वे कौन से मान हैं जो दानों समीकरणों को संतुष्ट करते हैं?

$$2^{0.7x} \cdot 3^{-1.25y} = 8 \frac{\sqrt{6}}{27} \text{ और } 4^{0.3x} \cdot 9^{0.2y} = 8(81)^{1/5}$$

✓ (a) $x = 2, y = 5$

(b) $x = 5, y = 2$

(c) $x = 2.5, y = 6$

(d) $x = 3, y = 5$

$4^{0.3x}$
 $2^{2 \times 0.3x}$
 $2^{1.2}$
 $2^{2 \times 0.3x}$
 2^3
 2^3
 2^3

118. What are the values of x and y that satisfy both the equations?

$$2^{0.7x} \cdot 3^{-1.25y} = 8 \frac{\sqrt{6}}{27} \text{ and } 4^{0.3x} \cdot 9^{0.2y} = 8(81)^{1/5}$$

x और y के वे कौन से मान हैं जो दानों समीकरणों को संतुष्ट करते हैं?

$$2^{0.7x} \cdot 3^{-1.25y} = 8 \frac{\sqrt{6}}{27} \text{ और } 4^{0.3x} \cdot 9^{0.2y} = 8(81)^{1/5}$$

~~(a)~~ $x = 2, y = 5$

~~(c)~~ $x = 2.5, y = 6$

~~(b)~~ $x = 5, y = 2$

~~(d)~~ $x = 3, y = 5$

$$2^x = 3^y = 6^{-z} = K$$

$$\left. \begin{aligned} 2^x &= K^1 \\ \textcircled{2}^1 &= K^{\frac{1}{x}} \end{aligned} \right\} \left. \begin{aligned} 3^y &= K^1 \\ \textcircled{3}^1 &= K^{\frac{1}{y}} \end{aligned} \right\} \left. \begin{aligned} 6^{-z} &= K^1 \\ \textcircled{6} &= K^{-\frac{1}{z}} \end{aligned} \right\}$$

$$2 \times 3 = 6$$

$$K^{\frac{1}{x}} \times K^{\frac{1}{y}} = K^{-\frac{1}{z}}$$

$$K^{\frac{1}{x} + \frac{1}{y}} = K^{-\frac{1}{z}}$$

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

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

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

यदि $2^x = 3^y = 6^{-z}$ तो $\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z} \right)$ बराबर है

(a) ~~0~~

(b) 1

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

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

$$a^m \times a^n = a^{m+n}$$

$$2^x = 4^y = 8^z$$

$$\Rightarrow 2^x = 2^{2y} = 2^{3z}$$

$$\Rightarrow x = 2y = 3z$$

$$x : y : z$$

$$6 : 3 : 2$$

$$\cancel{6k} \times \cancel{3k} \times \cancel{2k} = \cancel{288}$$

$$\therefore k^3 = 8$$

$$k = 2$$

$$\frac{1}{2 \times 12} + \frac{1}{4 \times 6} + \frac{1}{6 \times 4}$$

$$= \frac{1}{24} + \frac{1}{24} + \frac{1}{24} = \frac{3}{24} = \frac{1}{8}$$

120. If $2^x = 4^y = 8^z$ and $xyz = 288$, the value of

$$\frac{1}{2x} + \frac{1}{4y} + \frac{1}{6z} \text{ is}$$

यदि $2^x = 4^y = 8^z$ और $xyz = 288$, $\frac{1}{2x} + \frac{1}{4y} + \frac{1}{6z}$

का मान है

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

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

(c) $\frac{1}{15}$

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

TYPE - 06

INFINITE SERIES

01. Infinite series in product type

$$\begin{aligned}
 K &= \sqrt{x \sqrt{x \sqrt{x \dots \infty}}} \\
 \Rightarrow K^2 &= x \sqrt{x \sqrt{x \sqrt{x \dots \infty}}} \\
 \Rightarrow K^2 &= x \times K \\
 \Rightarrow K &= x
 \end{aligned}$$

$$\sqrt{\mathbf{x} \sqrt{\mathbf{x} \sqrt{\mathbf{x} \dots \infty}}} = \mathbf{x}$$

$$\begin{aligned}
 \therefore \sqrt{7 \sqrt{7 \sqrt{7 \dots \infty}}} &= 7 \\
 \sqrt{8 \sqrt{8 \sqrt{8 \dots \infty}}} &= 8
 \end{aligned}$$

121. Find the value of $\sqrt{a\sqrt{a\sqrt{a\ldots\infty}}}$

$\sqrt{a\sqrt{a\sqrt{a\ldots\infty}}}$ का मान ज्ञात कीजिए।

☒ (a) a

(c) a^3

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

(d) 0

122. $\sqrt{3\sqrt{3\sqrt{3}\dots\infty}}$ is equal to.

$\sqrt{3\sqrt{3\sqrt{3}\dots\infty}}$ के बराबर है:

(a) $\sqrt{3}$

~~(b) 3~~

(c) $2\sqrt{3}$

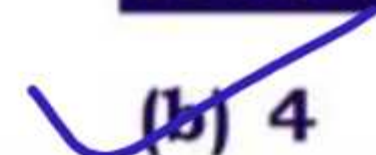
(d) $3\sqrt{3}$

123. If $x = \sqrt{4\sqrt{4\sqrt{4\sqrt{4\ldots}}}}$, then what is the value of x ?

यदि $x = \sqrt{4\sqrt{4\sqrt{4\sqrt{4\ldots}}}}$ है, तो x का मान क्या है?

UPSC CDS 16/04/2023

- (a) 2
- (c) 8

-  (b) 4
- (d) 16

$$7^1 = 343^{y-1}$$

$$\Rightarrow 7^1 = (7^3)^{y-1}$$

$$\Rightarrow 7^1 = (7)^{3y-3}$$

$$1 = 3y - 3$$

$$\Rightarrow 4 = 3y$$

$$\Rightarrow \frac{4}{3} = y$$

124. $\sqrt{7\sqrt{7\sqrt{7\sqrt{7\ldots\infty}}}} = 343^{y-1}$ then $y = ?$

$\sqrt{7\sqrt{7\sqrt{7\sqrt{7\ldots\infty}}}} = 343^{y-1}$ तो $y = ?$

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

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

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

(d) 1

$$x = \sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4}}}} \dots \infty$$

$$\begin{aligned} \Rightarrow x^2 &= 2\sqrt[3]{4x} \\ \Rightarrow x^6 &= 8x(4x) \\ \Rightarrow x^5 &= 32 \\ \Rightarrow x^5 &= 2^5 \\ \Rightarrow x &= 2 \end{aligned}$$

125. The value of $\sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4}}}}}} \dots$ is

$$\sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4\sqrt{2\sqrt[3]{4}}}}}} \dots \text{ का मान है}$$

- (a) 2
(c) 2^3

- (b) 2^2
(d) 2^5

$$126. \sqrt{27 \div \sqrt{27 \div \sqrt{27 \div \dots \infty}}} = ?$$

$$x = \sqrt{27 \div \sqrt{27 \div \sqrt{27 \div \dots \infty}}}$$

$$\Rightarrow x^2 = 27 \div \sqrt{27 \div \sqrt{27 \div \dots \infty}}$$

$$\Rightarrow x^2 = 27 \div x$$

$$\Rightarrow x^2 = \frac{27}{x}$$

$$\Rightarrow x^3 = 27$$

$$\Rightarrow x = \sqrt[3]{27} = 3$$

$$\sqrt{27 \div \sqrt{27 \div \sqrt{27 \div \dots \infty}}} = ?$$

$$(a) \checkmark \sqrt[3]{27}$$

$$(b) 27$$

$$(c) \sqrt[2]{27}$$

$$(d) \sqrt[4]{27}$$

$$\sqrt{x} \sqrt{x} \sqrt{x} \dots \infty = \frac{1}{2}$$

$$\Rightarrow (\sqrt{x})^{\frac{1}{2}} = \frac{1}{2}$$

$$\Rightarrow (x^{\frac{1}{2}})^{\frac{1}{2}} = \frac{1}{2}$$

$$\Rightarrow x^{\frac{1}{4}} = \frac{1}{2}$$

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

$x = \frac{1}{16}$

127. If $\sqrt{x} \sqrt{x} \sqrt{x} \dots \infty = \frac{1}{2}$ then $x = ?$

यदि $\sqrt{x} \sqrt{x} \sqrt{x} \dots \infty = \frac{1}{2}$ तो $x = ?$

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

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

✓ (c) $\frac{1}{16}$

(d) $\frac{1}{32}$

$$\sqrt{x} \sqrt{x} \sqrt{x} \dots = \frac{1}{3}$$

$$\Rightarrow (\sqrt{x})^3 = \frac{1}{3}$$

$$\Rightarrow (x^{\frac{1}{2}})^3 = \frac{1}{3}$$

$$\Rightarrow x^{\frac{1}{6}} = \frac{1}{3}$$

$$\Rightarrow (x^{\frac{1}{6}})^{1 \times 6} = \left(\frac{1}{3}\right)^{1 \times 6}$$

$$x^1 = \frac{1}{729}$$

$$Q. \sqrt{3\sqrt{3\sqrt{3\sqrt{3}}}} \dots \infty$$

Ans $x = \sqrt{3\sqrt{3\sqrt{3\sqrt{3}}}} \dots \infty$

$$x^2 = 3\sqrt{3\sqrt{3\sqrt{3\sqrt{3}}}} \dots \infty$$

$$x^2 = 3x$$

$$(x=3)$$

$$Q. \sqrt{3\sqrt{3\sqrt{3}}} = ?$$

Ans

$$x = \sqrt{3\sqrt{3\sqrt{3}}}$$

$$\Rightarrow x^2 = 3\sqrt{3\sqrt{3}}$$

$$\Rightarrow x^4 = 9 \times 3\sqrt{3}$$

$$\Rightarrow x^4 = 27\sqrt{3}$$

$$\Rightarrow x^8 = 729 \times 3$$

$$\Rightarrow x^8 = 2187$$

$$\Rightarrow x = \sqrt[8]{2187}$$

X

02. Finite series in product type

$$\sqrt{\mathbf{x} \sqrt{\mathbf{x} \sqrt{\mathbf{x} \sqrt{\mathbf{x}}}}}$$

$n =$ Count square root = 4

$$\text{ans} = x^{\frac{2^n - 1}{2^n}} = x^{\frac{2^4 - 1}{2^4}} = \boxed{x^{\frac{15}{16}}}$$

$$n=4$$

$$\begin{aligned} \text{ans} &= a^{\frac{2^n-1}{2^n}} \\ &= a^{\frac{15}{16}} \end{aligned}$$

128. Find the value of $\sqrt{a\sqrt{a\sqrt{a\sqrt{a}}}}$

$\sqrt{a\sqrt{a\sqrt{a\sqrt{a}}}}$ का मान ज्ञात कीजिए-

(a) $a^{\frac{7}{8}}$

(c) a

☒ (b) $a^{\frac{15}{16}}$

(d) a^4

$$n=6$$

$$\begin{aligned} \text{ans} &= 7^{\frac{2^n - 1}{2^n}} \\ &= 7^{\frac{2^6 - 1}{2^6}} \\ &= 7^{\frac{63}{64}} \end{aligned}$$

129. Find the value of

129. Find the value of $\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7}}}}}}$

$\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7}}}}}}}$ का मान ज्ञात कीजिए-

(a) $7^{\frac{63}{64}}$

(b) $7^{\frac{31}{32}}$

(c) $7^{\overline{15}}_{16}$

(d) 7^7

130. Find $\sqrt{12\sqrt{12\sqrt{12\sqrt{12\sqrt{12\sqrt{12}}}}}}$ =?

$\sqrt{12\sqrt{12\sqrt{12\sqrt{12\sqrt{12\sqrt{12}}}}}}$ का मान ज्ञात करें

(a) $12^{\frac{32}{31}}$

(b) $12^{\frac{64}{63}}$

(c) $12^{\frac{31}{32}}$

✓ (d) $12^{\frac{63}{64}}$

$$T-1 \quad \star \sqrt{a\sqrt{a\sqrt{a}}}\dots\infty$$

$$T-2 \quad \star \sqrt{a\sqrt{a\sqrt{a\sqrt{a}}}}\dots$$

$$\star \sqrt{a+\sqrt{a+\sqrt{a}}}\dots\infty$$

$$\star \sqrt{a-\sqrt{a-\sqrt{a}}}\dots\infty$$

03. Infinite series in addition or subtraction form

$$\sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \dots \infty}}}}$$

There are two types of questions.

TYPE- I: Factorise 'x' into two successive integers,
If it is addition series then answer is greater one and If it is subtraction series then answer is smaller one.

Q. $\sqrt{12+\sqrt{12+\sqrt{12}-\infty}}$

Ans $x = \sqrt{12+\sqrt{12+\sqrt{12}-\infty}}$

$$\Rightarrow x^2 = 12 + \sqrt{12 + \sqrt{12} - \infty}$$

$$\Rightarrow x^2 = 12 + x$$

$$\Rightarrow x^2 - x - 12 = 0$$

$$\Rightarrow x^2 - 4x + 3x - 12 = 0$$

$$\Rightarrow x(x-4) + 3(x-4) = 0$$

$$\Rightarrow (x-4)(x+3) = 0$$

$$x = 4 \quad \sim \quad ?$$



Q. $\sqrt{12-\sqrt{12-\sqrt{12}-\infty}}$

Ans $x = \sqrt{12-\sqrt{12-\sqrt{12}-\infty}}$

$$\Rightarrow x^2 = 12 - \sqrt{12 - \sqrt{12} - \infty}$$

$$\Rightarrow x^2 = 12 - x$$

$$\Rightarrow x^2 + x - 12 = 0$$

$$\Rightarrow x^2 + 4x - 3x - 12 = 0$$

$$\Rightarrow x(x+4) - 3(x+4) = 0$$

$$\Rightarrow (x+4)(x-3) = 0$$

$$x = -4$$



$$x = 3$$



Q. $\sqrt{12 + \sqrt{12 + \sqrt{12} - \infty}}$

$\checkmark \checkmark \textcircled{4} \times 3$

Q. $\sqrt{12 - \sqrt{12 - \sqrt{12} - \infty}}$

$4 \times \textcircled{3} \checkmark$

1×12
 2×6
 3×4
)

131. $\sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}$ is equal to.

4×3

$\sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}$ के बराबर है:

(a) 3

(c) 6

~~(b) 4~~

(d) 2

132. Find the value of

$$\sqrt{\underset{6 \times 5}{30}} + \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots \infty}}}$$

$$\sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots \infty}}}}$$

का मान ज्ञात कीजिए

(a) 3

(b) 4

✓ (c) 6

(d) 5

133. Let $x = \sqrt{272 + \sqrt{272 + \sqrt{272 + \sqrt{272 + \dots + \infty}}}}$ then x equals

माना $x = \sqrt{272 + \sqrt{272 + \sqrt{272 + \sqrt{272 + \dots + \infty}}}}$ तो x बराबर है 16×17

(a) 16

(c) 17

(b) ~~$4\sqrt{13}$~~

(d) ~~4.35~~

$$\begin{array}{r} 17 \\ 272 \\ \hline 16 \end{array}$$

134. Find the value of the given expression.

दिए गए व्यंजक का मान ज्ञात कीजिए।

$$\sqrt{\underset{4 \times 5}{20}} - \sqrt{20 - \sqrt{20 - \sqrt{20 - \dots \infty}}}$$

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- (a) 4
(c) 5

- (b) 6
(d) 2

2

135. What is the value of :

$$8 \div 4$$

$$= 2$$

$$\left(\sqrt{\underset{\substack{\text{8} \times \text{9}}{\text{72}}}} - \sqrt{72} - \sqrt{72} - \dots \infty \right) \div$$

$$\left(\sqrt{\underset{\substack{\text{4} \times \text{5}}{\text{20}}}} - \sqrt{20} - \sqrt{20} - \dots \infty \right) \text{ का मान क्या है?}$$

DOE PRT 13/11/2019 (Shift- 02)

- (a) 4
(c) 3.6

- (b) 2
(d) 8

136. Let $x = \sqrt{42 - \sqrt{42 - \sqrt{42 - \sqrt{42 - \dots - \infty}}}}$ then x equals $\sqrt{6 \times 7}$

माना $x = \sqrt{42 - \sqrt{42 - \sqrt{42 - \sqrt{42 - \dots - \infty}}}}$ तो x बराबर है

☒ (a) 6

(b) 7

(c) Between 6 and 7

(d) Greater than 7

$$\sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \dots \infty}}}}$$

TYPE- II: If 'x' can not be factorized into two successive

$$\sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \sqrt{\mathbf{x} \pm \dots \infty}}}} = \frac{\sqrt{\mathbf{1} + \mathbf{4x} \pm \mathbf{1}}}{\mathbf{2}}$$

$$Q. \sqrt{a + \sqrt{a + \sqrt{a}}} - \infty$$

Ans $x = \sqrt{a + \sqrt{a + \sqrt{a}}} - \infty$

$$\Rightarrow x^2 = a + \sqrt{a + \sqrt{a}} - \infty$$

$$\Rightarrow x^2 = a + x$$

$$\Rightarrow \underline{x^2 - x - a = 0}$$

$$x = \frac{1 + \sqrt{1 - 4 \times 1 \times (-a)}}{2 \times 1}$$

$$x = \frac{1 + \sqrt{1 + 4a}}{2}$$

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$Q. \sqrt{a + \sqrt{a + \sqrt{a}}} \dots \infty$$

$$\text{ans} = \frac{\sqrt{1+4a} + 1}{2}$$

$$Q. \sqrt{a - \sqrt{a - \sqrt{a}}} \dots \infty$$

$$\text{ans} = \frac{\sqrt{1+4a} - 1}{2}$$

$$\text{ans} = \frac{\sqrt{1+4a} + 1}{2}$$

$$= \frac{\sqrt{21} + 1}{2}$$

137. $\sqrt{5 + \sqrt{5 + \sqrt{5 + \dots \infty}}} = ?$

(a) $\frac{\sqrt{21} + 1}{2}$

(b) $\frac{\sqrt{21} - 1}{2}$

(c) $\frac{\sqrt{21} + 3}{2}$

(d) $\frac{\sqrt{21} - 3}{2}$

138. $\sqrt{31 + \sqrt{31 + \sqrt{31 + \sqrt{31 + \dots \infty}}}} = ?$

(a) $5\sqrt{5} - 1.5$

 (b) $2.5\sqrt{5} + 0.5$

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

(d) $\frac{2\sqrt{31} + 1}{2}$

Ans = $\frac{\sqrt{1+4a} + 1}{2}$

$= \frac{\sqrt{125+1}}{2} = \frac{5\sqrt{5}+1}{2} = 2.5\sqrt{5} + 0.5$

139. $\sqrt{1 - \sqrt{1 - \sqrt{1 - \dots \infty}}} = ?$

$$\begin{aligned} \text{ans} &= \frac{\sqrt{1+4a} - 1}{2} \\ &= \frac{\sqrt{5} - 1}{2} \end{aligned}$$

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

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

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

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

$$\begin{aligned} \text{ans} &= \frac{\sqrt{1+4a}-1}{2} \\ &= \frac{\sqrt{77}-1}{2} \end{aligned}$$

140. Find $\sqrt{19 - \sqrt{19 - \sqrt{19 - \sqrt{19 \dots \infty}}}} = ?$

$\sqrt{19 - \sqrt{19 - \sqrt{19 - \sqrt{19 \dots \infty}}}}$ ज्ञात करें

(a) ☒ $\frac{\sqrt{77}-1}{2}$

(b) $\frac{\sqrt{19}+3}{2}$

(c) $\frac{\sqrt{77}+1}{2}$

(d) Between 4 and 5

$$\begin{array}{l|l|l|l}
 1) \sqrt{7\sqrt{7\sqrt{7}} \dots \infty} & 2) \sqrt{7\sqrt{7\sqrt{7}}} & 3) \sqrt{12+\sqrt{12+\dots \infty}} & 4) \sqrt{12-\sqrt{12-\sqrt{12}} \dots \infty} \\
 = \textcircled{7} & = 7^{\frac{2^n-1}{2^n}} & \underbrace{4 \times 3} & \underbrace{4 \times \textcircled{3}} \\
 & = 7^{\frac{7}{8}} & = \textcircled{4} \checkmark & = \textcircled{3} \checkmark
 \end{array}$$

$$5) \sqrt{11+\sqrt{11+\sqrt{11}} \dots \infty}$$

$$\begin{aligned}
 \text{ans} &= \frac{\sqrt{1+4a}+1}{2} \\
 &= \frac{\sqrt{4s+1}}{2} \\
 &= \frac{3\sqrt{s+1}}{2}
 \end{aligned}$$

$$6) \sqrt{11-\sqrt{11-\sqrt{11-\sqrt{11}} \dots \infty}}$$

$$\begin{aligned}
 \text{ans} &= \frac{\sqrt{1+4a}-1}{2} \\
 &= \frac{\sqrt{4s-1}}{2} \\
 &= \frac{3\sqrt{s-1}}{2}
 \end{aligned}$$

AN IMPORTANT RESULT

$$x = \sqrt{a + b \sqrt{a + b \sqrt{a + \dots \dots \dots \infty}}} = \frac{\sqrt{4a + b^2} + b}{2}$$

$$\Rightarrow x = \sqrt{a + bx}$$

$$\Rightarrow x^2 - bx - a = 0$$

$$\therefore x = \frac{-b \pm \sqrt{b^2 - 4 \times 1 \times (-a)}}{2 \times 1}$$

$$= \frac{-b \pm \sqrt{b^2 + 4a}}{2}$$

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

AN IMPORTANT RESULT

$$\checkmark \quad x = \sqrt{a + b\sqrt{a + b\sqrt{a + \dots\infty}}} = \frac{\sqrt{4a + b^2} + b}{2}$$

$$\checkmark \quad y = \sqrt{a - b\sqrt{a - b\sqrt{a - \dots\infty}}} = \frac{\sqrt{4a + b^2} - b}{2}$$

AN IMPORTANT RESULT

$$x = \sqrt{\underline{a} + \textcircled{b}\sqrt{a + b}\sqrt{a + \dots\dots\dots\infty}} = \frac{\sqrt{4a + b^2} + b}{2}$$

$$y = \sqrt{a - b\sqrt{a - b}\sqrt{a - \dots\dots\dots\infty}} = \frac{\sqrt{4a + b^2} - b}{2}$$

$$\begin{aligned} x - y &= \frac{b - (-b)}{2} \\ &= \frac{b + b}{2} = \cancel{2} \frac{b}{\cancel{2}} \end{aligned}$$

$$\begin{aligned} xy &= \left(\frac{\sqrt{4a + b^2} + b}{2} \right) \left(\frac{\sqrt{4a + b^2} - b}{2} \right) \\ &= \frac{4a + \cancel{b^2} - \cancel{b^2}}{\cancel{4}} = a \end{aligned}$$

$$\textcircled{1}. \quad x = \sqrt{\underset{a}{35} + 2\underset{b}{\sqrt{35}} + 2\sqrt{35}} - \infty$$

$\textcircled{7}$

Ans

$$7-5$$

$$x-y = \textcircled{b} = 2$$

$$xy = a = 35$$

$$7 \times 5$$

$$x+y = 7+5 = \underline{\underline{12}}$$

$$y = \sqrt{35 - 2\sqrt{35} - 2\sqrt{35}} - \infty$$

$\textcircled{5}$

$$\begin{aligned} \text{ans} &= \frac{\sqrt{4a+b^2}+b}{2} \\ &= \frac{\sqrt{140+4}+2}{2} \\ &= \frac{12+2}{2} = \textcircled{7} \end{aligned}$$

141. Find $\sqrt{\underset{a}{35} + \underset{b}{2}\sqrt{35 + 2\sqrt{35 + 2\sqrt{35 + \dots\infty}}}} = ?$

$\sqrt{35 + 2\sqrt{35 + 2\sqrt{35 + 2\sqrt{35 + \dots\infty}}}}$ ज्ञात करें

(a) 6

(c) 5

☒ (b) 7

(d) 6.4

141. Find $\sqrt{\underset{a}{35} + \underset{b}{2}\sqrt{35 + 2\sqrt{35 + 2\sqrt{35 + \dots\infty}}} = ?$

$\sqrt{35 + 2\sqrt{35 + 2\sqrt{35 + 2\sqrt{35 + \dots\infty}}}$ ज्ञात करें

(a) 6

☒ (b) 7

(c) 5

(d) 6.4

✓
7x5

$$\begin{aligned}
 \text{ans} &= \frac{\sqrt{4a+b^2} - b}{2} \\
 &= \frac{\sqrt{616+9} - 3}{2} \\
 &= \frac{25-3}{2} = \textcircled{11}
 \end{aligned}$$

142. Find $\sqrt{\underbrace{154}_a - \underbrace{3}_b \sqrt{154 - 3\sqrt{154 - 3\sqrt{154 - \dots\infty}}}} = ?$

$\sqrt{154 - 3\sqrt{154 - 3\sqrt{154 - 3\sqrt{154 - \dots\infty}}}}$ ज्ञात करें?

(a) 13

(b) 14

(c) 11

(d) 9

142. Find $\sqrt{\underbrace{154}_{14 \times 11} - 3\sqrt{154 - 3\sqrt{154 - 3\sqrt{154 - \dots\infty}}} = ?$

$\sqrt{154 - 3\sqrt{154 - 3\sqrt{154 - 3\sqrt{154 - \dots\infty}}}}$ ज्ञात करें?

(a) 13

(b) 14

✓ (c) 11

(d) 9

$$Q. a-b=5 \quad ab=3 \quad a+b=?$$

$$\underline{\text{Ans}} \quad (a+b)^2 = (a-b)^2 + 4ab$$

$$\Rightarrow (a+b)^2 = 25 + 12$$

$$\Rightarrow (a+b)^2 = 37$$

$$\Rightarrow (a+b) = \sqrt{37}$$

$$P - Q = b = \textcircled{3}$$

$$PQ = a = \textcircled{11}$$

$$(P+Q)^2 = (P-Q)^2 + 4PQ$$

$$\Rightarrow (P+Q)^2 = 9 + 44$$

$$\Rightarrow (P+Q)^2 = 53$$

$$\Rightarrow P+Q = \sqrt{53}$$

143. If $P = \sqrt{\underset{a}{11} + \underset{b}{3}\sqrt{11 + 3\sqrt{11 + 3\sqrt{11 - \dots\infty}}}}$

$Q = \sqrt{11 - 3\sqrt{11 - 3\sqrt{11 - 3\sqrt{11 - \dots\infty}}}}$ then $P + Q = ?$

यदि $P = \sqrt{11 + 3\sqrt{11 + 3\sqrt{11 + 3\sqrt{11 - \dots\infty}}}}$ और $Q =$

$\sqrt{11 - 3\sqrt{11 - 3\sqrt{11 - 3\sqrt{11 - \dots\infty}}}}$ तो $P + Q = ?$

(a) $\sqrt{47}$

(b) $\sqrt{65}$

(c) $\sqrt{41}$

☒ (d) $\sqrt{53}$

$$Q. \quad P = \sqrt{16 + 2\sqrt{16 + 2\sqrt{16} - \dots - \infty}}$$

$$Q = \sqrt{\underbrace{16}_a - 2\underbrace{\sqrt{16 - 2\sqrt{16} - \dots - \infty}}_b}$$

Ans

① $P - Q = b = 2$

② $PQ = a = 16$

③ $P + Q$

$$(P + Q)^2 = (P - Q)^2 + 4PQ$$

$$\Rightarrow (P + Q)^2 = 4 + 64$$

$$\Rightarrow (P + Q)^2 = 68$$

$$\Rightarrow P + Q = 2\sqrt{17}$$

AN IMPORTANT RESULT

$$x = \sqrt{a + b} \sqrt{a - b} \sqrt{a \dots \dots \infty} = \frac{\sqrt{4a - 3b^2} + b}{2}$$

$$y = \sqrt{a - b} \sqrt{a + b} \sqrt{a \dots \dots \infty} = \frac{\sqrt{4a - 3b^2} - b}{2}$$

$$\begin{aligned} & \frac{\sqrt{4a-3b^2}+b}{2} \\ &= \frac{\sqrt{28-12}+2}{2} \\ &= \frac{\sqrt{16}+2}{2} = \textcircled{3} \end{aligned}$$

144. $\sqrt{\underset{a}{7} + \underset{b}{2}\sqrt{7 - 2\sqrt{7 + 2\sqrt{7 - 2\sqrt{7 + \dots}}}}} = ?$

(a) $\sqrt{51}$

(b) 4

(c) $\frac{3 + \sqrt{15}}{2}$

☒ (d) 3

$$\frac{\sqrt{4a-3b^2}-b}{2}$$

$$= \frac{\sqrt{28-12}-2}{2}$$

$$= \frac{\sqrt{16}-2}{2} = \frac{4-2}{2} = \textcircled{1}$$

$$\sqrt{\underset{a}{7}-\underset{b}{2}\sqrt{7+2\sqrt{7-2\sqrt{7+2\sqrt{7}}}\dots}}=?$$

(a) $\sqrt{51}$

(b) 4

(c) $\frac{3+\sqrt{15}}{2}$

(d) 3

AN IMPORTANT RESULT

$$x = \sqrt{a + \sqrt{a - \sqrt{a + \dots \infty}}} = \frac{\sqrt{4a - 3} + 1}{2}$$

$$y = \sqrt{a - \sqrt{a + \sqrt{a - \sqrt{a + \dots \infty}}}} = \frac{\sqrt{4a - 3} - 1}{2}$$

$$\begin{aligned} \text{Ans} &= \frac{\sqrt{4a-3b^2} - b}{2} \\ &= \frac{\sqrt{24-3} - 1}{2} \\ &= \frac{\sqrt{21} - 1}{2} \end{aligned}$$

145. Let $x = \sqrt{\underset{a}{6} - \underset{b}{1}\sqrt{6 + \sqrt{6 - \sqrt{6 + \dots}}}}$ to infinity ; then x equals

माना $x = \sqrt{6 - \sqrt{6 + \sqrt{6 - \sqrt{6 + \dots}}}}$ से अनंत तक; तो x बराबर है

(a) 3

(b) $\sqrt{21}$

☒ (c) $\frac{\sqrt{21} - 1}{2}$

(d) $\frac{\sqrt{21} + 1}{2}$

$$\textcircled{+} \frac{\sqrt{4a-3b^2} + b}{2}$$

$$\textcircled{-} \frac{\sqrt{4a-3b^2} - b}{2}$$

$$Q. \sqrt{5 + \sqrt{5 + \sqrt{5 + \dots}}} \rightarrow \infty$$

$$\text{ans} = \frac{\sqrt{1+4a} + 1}{2}$$

$$\begin{aligned} \text{ans} &= \frac{\sqrt{1+20} + 1}{2} \\ &= \frac{\sqrt{21} + 1}{2} \end{aligned}$$

$$Q. \sqrt{5 - \sqrt{5 - \sqrt{5 - \dots}}} \rightarrow \infty$$

$$\text{ans} = \frac{\sqrt{1+4a} - 1}{2}$$

$$\begin{aligned} \text{ans} &= \frac{\sqrt{1+20} - 1}{2} \\ &= \frac{\sqrt{21} - 1}{2} \end{aligned}$$

$$Q. \sqrt{5 + \sqrt{5 - \sqrt{5 + \sqrt{5 - \dots}}}} \rightarrow \infty$$

$$\text{ans} = \frac{\sqrt{4a-3} + 1}{2}$$

$$\begin{aligned} &= \frac{\sqrt{20-3} + 1}{2} \\ &= \frac{\sqrt{17} + 1}{2} \end{aligned}$$

MISCELLANEOUS QUESTIONS

$$\begin{aligned} & \sqrt{\frac{\sqrt{5}-1}{\sqrt{5}+1}} \\ &= \sqrt{\frac{(\sqrt{5}-1) \times (\sqrt{5}-1)}{(\sqrt{5}+1)(\sqrt{5}-1)}} \\ &= \sqrt{\frac{(\sqrt{5}-1)^2}{(5-1)}} \\ &= \frac{(\sqrt{5}-1)}{2} = \frac{2.24-1}{2} \\ &= \frac{1.24}{2} = 0.62 \end{aligned}$$

146. If $\sqrt{5} = 2.24$, then find the value of $\sqrt{\frac{\sqrt{5}-1}{\sqrt{5}+1}}$.

यदि $\sqrt{5} = 2.24$, तो $\sqrt{\frac{\sqrt{5}-1}{\sqrt{5}+1}}$ का मान ज्ञात कीजिए।

SSC Phase X 04/08/2022 (Shift- 03)

(a) 0.68

(b) 0.55

(c) 0.62

(d) 0.59

$$\begin{aligned} & 5\sqrt{3} + 5\sqrt{3} \\ \Rightarrow 10\sqrt{3} &= 17.32 \end{aligned}$$

$$\begin{aligned} & 14\sqrt{3} + 6\sqrt{3} \\ &= 20\sqrt{3} = 17.32 \times 2 \\ &= 34.64 \end{aligned}$$

147. If $5\sqrt{3} + \sqrt{75} = 17.32$ then the value of $14\sqrt{3} + \sqrt{108}$ is:

यदि $5\sqrt{3} + \sqrt{75} = 17.32$ है, तो $14\sqrt{3} + \sqrt{108}$ का मान ज्ञात करें।
 $\sqrt{36 \times 3}$

SSC CGL 20/04/2022 (Shift-03)

- (a) 32.46
 (c) ✓ 34.64

- (b) 35.64
 (d) 33.86

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

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

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

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

$$= 5-3$$

$$= \textcircled{2}$$

$$Q. (\sqrt{7}-\sqrt{3})$$

$$\underline{\text{Ans}} \quad (\sqrt{7}-\sqrt{3}) \times \underline{(\sqrt{7}+\sqrt{3})}$$

Q. $(\sqrt{5} + \sqrt{3} + \sqrt{2})$

Ans $\frac{1}{[(\sqrt{5} + \sqrt{3}) + (\sqrt{2})]} \times \frac{(\sqrt{5} + \sqrt{3} - \sqrt{2})}{[(\sqrt{5} + \sqrt{3}) - (\sqrt{2})]}$

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

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

$$= \boxed{\frac{(\sqrt{5} + \sqrt{3} - \sqrt{2})}{6 + 2\sqrt{15}}}$$

148. Which of the following can be a rationalising

factor of $(\sqrt{2} + \sqrt{3} + \sqrt{5})$?

By option

(a) $(\sqrt{2} + \sqrt{3} + \sqrt{5}) \times (\sqrt{2} - \sqrt{3} - \sqrt{5}) \sqrt{6}$
 $= (2 - \cancel{\sqrt{6}} - \cancel{\sqrt{10}} + \cancel{\sqrt{6}} - 3 - \sqrt{15} + \cancel{\sqrt{10}} - \sqrt{15} - 5) \sqrt{6}$
 $= (-6 - 2\sqrt{15}) \sqrt{6} \quad \times$

निम्नलिखित में से कौन-सा $(\sqrt{2} + \sqrt{3} + \sqrt{5})$ का परिमेयकरण गुणांक हो सकता है?

SSC CHSL 27/05/2022 (Shift- 2)

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

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

(b) $(\sqrt{2} + \sqrt{3} + \sqrt{5}) (\sqrt{2} + \sqrt{3} - \sqrt{5}) \sqrt{6}$
 $= (\cancel{2} + \sqrt{6} - \cancel{\sqrt{10}} + \sqrt{6} + \cancel{3} - \sqrt{15} + \cancel{\sqrt{10}} + \sqrt{15} - \cancel{5}) \sqrt{6}$
 $= 2\sqrt{6} \times \sqrt{6}$
 $= 2 \times 6 = 12$

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

148. Which of the following can be a rationalising factor of $(\sqrt{2} + \sqrt{3} + \sqrt{5})$?

निम्नलिखित में से कौन-सा $(\sqrt{2} + \sqrt{3} + \sqrt{5})$ का परिमेयकरण गुणांक हो सकता है?

SSC CHSL 27/05/2022 (Shift- 2)

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

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

m-1

$$\begin{aligned}
 x &= \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} \\
 &= \sqrt{\frac{4+2\sqrt{3}}{2}} + \sqrt{\frac{4-2\sqrt{3}}{2}} \\
 &= \frac{\sqrt{3}+1}{\sqrt{2}} + \frac{\sqrt{3}-1}{\sqrt{2}} \\
 &= \frac{\sqrt{3} + \cancel{1} + \sqrt{3} - \cancel{1}}{\sqrt{2}} \\
 &= \frac{2\sqrt{3}}{\sqrt{2}} = \sqrt{6}
 \end{aligned}$$

149. Find the value of $\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$.

$\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$ का मान ज्ञात कीजिए।

SSC CHSL 06/06/2022 (Shift 03)

☒ (a) $\sqrt{6}$

(b) $2\sqrt{3}$

(c) $2\sqrt{2}$

(d) 6

m-2

149. Find the value of $\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$.

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

$$\Rightarrow x^2 = 2 + \cancel{\sqrt{3}} + 2 - \cancel{\sqrt{3}} + 2$$

$$\Rightarrow x^2 = 6$$

$$\Rightarrow x = \sqrt{6}$$

$\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$ का मान ज्ञात कीजिए।

SSC CHSL 06/06/2022 (Shift 03)

☒ (a) $\sqrt{6}$

(c) $2\sqrt{2}$

(b) $2\sqrt{3}$

(d) 6

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

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

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

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

$$\Rightarrow c = \frac{2}{2} \text{ ①}$$

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

यदि $\sqrt{1+\frac{\sqrt{3}}{2}} - \sqrt{1-\frac{\sqrt{3}}{2}} = c$ है, तो c का मान कितना होगा?

SSC CGL MAINS 03 Feb 2022

- (a) 1
(c) 3

- (b) 4
(d) 2

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

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

यदि $\sqrt{1 + \frac{\sqrt{3}}{2}} - \sqrt{1 - \frac{\sqrt{3}}{2}} = c$ है, तो c का मान कितना होगा?

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

$$\Rightarrow c^2 = 2 - 2 \times \frac{1}{2}$$

$$\Rightarrow c^2 = 1$$

$$\Rightarrow c = 1$$

(a) 1

(c) 3

(b) 4

(d) 2

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