

55.

$$\text{Solve } \sqrt{2\sqrt{2}} = 2^{\frac{1}{2} \times \frac{1}{2}} \times 2^{\frac{1}{2}} = 2^{\frac{1}{4} + \frac{1}{2}} = 2^{\frac{3}{4}}$$

$$\text{Solve } \sqrt{2\sqrt{2\sqrt{2}}} = 2^{\frac{1}{8} + \frac{1}{4} + \frac{1}{2}} = 2^{\frac{1+2+4}{8}} = 2^{\frac{7}{8}}$$

$$\text{Solve } \sqrt[2 \times 3]{6\sqrt{2\sqrt{3}}} = 2^{\frac{1}{4} + \frac{1}{2}} \times 3^{\frac{1}{8} + \frac{1}{2}}$$

$$\text{Solve } \sqrt{2\sqrt{2\sqrt{2\sqrt{2}}}} = 2^{\frac{1}{16} + \frac{1}{8} + \frac{1}{4} + \frac{1}{2}} = 2^{\frac{15}{16}}$$

$$\text{Solve } \sqrt{4\sqrt{8\sqrt{16}}} = 2^{\frac{4}{8} + \frac{3}{4} + \frac{2}{2}} =$$

$$2^{\frac{1}{8}} \times 2^{\frac{1}{4}} \times 2^{\frac{1}{2}}$$

$$(16)^{\frac{1}{8}} = (2^4)^{\frac{1}{8}} = 2^{\frac{4}{8}}$$

$$(2^m)^n = 2^{mn}$$

56.

$$\sqrt{2 \sqrt{4 \sqrt{2 \sqrt{4 \sqrt{2 \sqrt{4 \dots}}}}} = x$$

~~a) 2~~ b) 2^2
 c) 2^3 d) 2^5

$$\sqrt{2 \sqrt[3]{4 \cdot x}} = x^2$$

$$3x^2 = 8 \cdot 4 \cdot x = x^6 \cdot 5$$

$$\Rightarrow x = x$$

coaching center

57. $\sqrt[3]{\sqrt[2]{0.004096}}$

a) 4

~~b) 0.4~~

c) 0.04

d) 0.004

$$(\cdot 004096)^{\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}}$$

$$2^{12} = 4096$$

$$6 \times \frac{1}{6} = 1$$

$$= \frac{2^2}{2^6} = \frac{1}{2^4} = \frac{1}{16} = 0.0625$$

coaching center

58. What is the value of
का मान क्या है?

(HW)

$$\sqrt{4600 + \sqrt{540 + \sqrt{1280 + \sqrt{250 + \sqrt{\frac{36}{6}}}}} ?$$

a) 69 ~~b) 68~~ c) 70 d) 72

$\sqrt{256} = 16$

$\sqrt{1296} = 36$

$\sqrt{576} = 24$

$$\sqrt{4624} = 68$$

coaching center

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

HW

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

I. $\sqrt{625} + \sqrt[4]{1296} + \sqrt{1024} > 90$

II. $\sqrt[3]{\sqrt{729}} + \sqrt[4]{\sqrt{256}} = 5$

a) Only I b) Only II c) Both I and II d) Neither I nor II

$25 + 6 + 32 > 90$

$63 > 90$ false

$(729)^{\frac{1}{6}} + (256)^{\frac{1}{8}} = 5$

$\Rightarrow 3 + 2 = 5$ true

60. What is the value of $\sqrt{29.16} + \sqrt{0.2916} + \sqrt{0.002916} + \sqrt{0.00002916}$?

(HW)

$\sqrt{29.16} + \sqrt{0.2916} + \sqrt{0.002916} + \sqrt{0.00002916}$ का मान क्या होगा ?

- a) 5.9949 b) 5.9894 c) 5.9984 d) 5.9994

$$\sqrt{2916} = 54$$

$$\begin{array}{r} 5.4 \\ .54 \\ .054 \\ .0054 \\ \hline 5.9994 \end{array}$$

coaching center

61. $(0.04)^{-1.5}$ is equal to
 $(0.04)^{-1.5}$ बराबर है :

a) 25 ~~b) 125~~

c) 60

d) 5

$$\begin{aligned} a^{-n} &= \frac{1}{a^n} \\ \Downarrow \\ \left(\frac{a^{-n}}{1}\right) &= \left(\frac{1}{a}\right)^n \end{aligned}$$

$$\begin{aligned} &= \left(\frac{4}{100}\right)^{-\frac{3}{2}} \\ &= \left(\frac{25}{\cancel{100}}\right)^{\frac{3}{2}} \\ &= 5^{\cancel{2} \times \frac{3}{2}} = 125 \end{aligned}$$

Knowledge + Practice

जल्दबाजी i) शांति

ii) Mentally

coaching center

62. What is the value of $\frac{\sqrt{0.0032}}{\sqrt{0.32}}$?

$\frac{\sqrt{0.0032}}{\sqrt{0.32}}$ किसके बराबर है ?

a) 0.0001

b) 0.001

c) 0.01

~~d) 0.1~~

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

$$\sqrt{\frac{0.0032 \times 100}{0.32 \times 10000}} = \frac{1}{10} = 0.1$$

coaching center

$\sqrt{-ve} \rightarrow$ Imaginary

63. The expression $(\sqrt{2})^{(\sqrt{2})^{(\sqrt{2})}}$ gives

$$\sqrt{2} = 1.414$$

$\sqrt{+ve} \rightarrow$ Real

- a) A natural number
- b) an integer and not a natural number
- c) A rational number but not an integer
- d) A real number but not a rational number

$(\sqrt{2})^2 = 2$ \rightarrow even natural

$$(\sqrt{2})^3 = 2\sqrt{2}$$

$(\sqrt{2})^4 = 4$

$$\frac{p}{q}, q \neq 0$$

$$\frac{2}{3}, \frac{7}{8}, \frac{9}{4}$$

दिया गया व्यंजक $(\sqrt{2})^{(\sqrt{2})^{(\sqrt{2})}}$ है :

- a) एक प्राकृतिक संख्या
- b) एक पूर्णांक पर प्राकृतिक संख्या नहीं
- c) एक परिमेय संख्या पर पूर्णांक नहीं
- d) एक वास्तविक संख्या पर परिमेय नहीं

$$\sqrt{2}^x, \sqrt{3}^x, \sqrt{16} = 4$$

64. What is $\frac{5+\sqrt{10}}{5\sqrt{5}-2\sqrt{20}-\sqrt{32}+\sqrt{50}}$ equal to ?

$\frac{5+\sqrt{10}}{5\sqrt{5}-2\sqrt{20}-\sqrt{32}+\sqrt{50}}$ किसके बराबर है ?
 a) 5 b) $5\sqrt{2}$ $\rightarrow 25 \times 2$ c) $5\sqrt{5}$

$$\sqrt{4} = 2$$

~~$$d) \sqrt{5}$$~~

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

$$= \frac{5 + \sqrt{10}}{5\sqrt{5} - 4\sqrt{5} - 4\sqrt{2} + 5\sqrt{2}}$$

$$= \frac{5 + \sqrt{10}}{\sqrt{5} + \sqrt{2}}$$

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

$$\begin{aligned}2\sqrt{20} \\ 4 \times 5 \\ = 2 \times 2\sqrt{5} \\ = 4\sqrt{5}\end{aligned}$$

$$\sqrt{32} = \sqrt{16 \times 2}$$

coaching center

65. $9\sqrt{x} = \sqrt{12} + \sqrt{147}$, then $x =$

a) 2

~~b) $\frac{4 \times 3}{7 \times 3}$~~

c) 9

d) 5

$$= 2\sqrt{3} + 7\sqrt{3}$$

$$9\sqrt{x} = 9\sqrt{3}$$

$$\Rightarrow x = 3$$

coaching center

66. Let $x = \sqrt[6]{27} - \sqrt{6\frac{3}{4}}$ and $y = \frac{\sqrt{45+\sqrt{605+\sqrt{245}}}}{\sqrt[9]{45+\sqrt{605+\sqrt{245}}}}$, then the value of $x^2 + y^2$ is:

$$\sqrt{27} = \sqrt{9 \times 3} = 3\sqrt{3}$$

यदि $x = \sqrt[6]{27} - \sqrt{6\frac{3}{4}}$ और $y = \frac{\sqrt[9]{45+\sqrt{605+\sqrt{245}}}}{\sqrt{80+\sqrt{125}}}$ है, तो $x^2 + y^2$ का मान क्या होगा?

- a) $\frac{223}{36}$
 b) $\frac{221}{36}$
 c) $\frac{221}{9}$
 d) $\frac{227}{9}$

$$\frac{3}{4} + \frac{49}{9} = \frac{27+196}{36} = \frac{223}{36}$$

$$1x - 1.5x = -.5x$$

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

$$y = \frac{3\sqrt{5} + 11\sqrt{5} + 7\sqrt{5}}{4\sqrt{5} + 5\sqrt{5}} = \frac{21\sqrt{5}}{9\sqrt{5}} = \frac{7}{3}$$

coaching center

$$67. 2\sqrt[3]{32} - 3\sqrt[3]{4} + \sqrt[3]{500}$$

$$\text{a) } 4\sqrt[3]{6}$$

$$\text{b) } 3\sqrt[3]{24}$$

$$\text{c) } \cancel{25 \times 4} \quad \cancel{6\sqrt[3]{4}}$$

d) 916

$$\begin{aligned} & \sqrt{32} \\ &= \sqrt{16 \times 2} \\ &= \sqrt{4 \times 4 \times 2} \\ &= 4\sqrt{2} \end{aligned}$$

$$2 \sqrt[3]{8 \times 4}$$

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

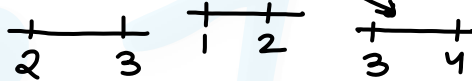
$$= 6 \sqrt[3]{4}$$

coaching center

68. Let $\sqrt[3]{a} = \sqrt[3]{26} + \sqrt[3]{7} + \sqrt[3]{63}$ then

अगर $\sqrt[3]{a} = \sqrt[3]{26} + \sqrt[3]{7} + \sqrt[3]{63}$ है तो:

- ~~a) $a < 729$ but $a > 216$~~ b) $a < 216$
c) $a > 729$ d) $a = 729$



$$\sqrt[3]{a} > 2 + 1 + 3 = 6$$
$$\Rightarrow a > 216$$

$$\sqrt[3]{a} < 3 + 2 + 4 = 9$$
$$a < 729$$

coaching center

69. If $3\sqrt[4]{x} + 4\sqrt[4]{x} = 5\sqrt[4]{x}$, then the value of x is:

यदि $3\sqrt[4]{x} + 4\sqrt[4]{x} = 5\sqrt[4]{x}$, तो x का मान है:

a) 4

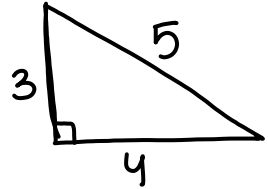
b) 2

c) 8

~~d) 16~~

$$x^{\frac{1}{4}} = 2$$

$$x = 16$$



$$3^2 + 4^2 = 5^2$$

$$5^2 + 12^2 = 13^2$$

coaching center

70. If $5^{\sqrt[3]{x}} + 12^{\sqrt[3]{x}} = 13^{\sqrt[3]{x}}$, then the value of x is:

यदि $5^{\sqrt[3]{x}} + 12^{\sqrt[3]{x}} = 13^{\sqrt[3]{x}}$, तो x का मान है:

a) 2

c) 1

~~b) 8~~

d) 4

$$x^{\frac{1}{3}} = 2$$

$$x = 8$$

coaching center

$$x+y-2z = 24z-15-3y$$

$$\Rightarrow x+4y-26z = -15$$

$$4y-6z = 2y+2z$$

$$\Rightarrow 2y = 8z$$

$$\Rightarrow y = 4z$$

$$4x-3z = 2x+2z$$

$$\Rightarrow 2x = 5z$$

$x=5$

$$\begin{array}{r} 2.5 \\ 16 \\ -26 \\ \hline +7.5z = +15 \\ \Rightarrow z = 2 \end{array}$$

71. If $2^{x+y-2z} = 8^{8z-5-y}$; $5^{4y-6z} = 25^{y+z}$; $3^{4x-3z} = 9^{x+z}$ then the value of $2x + 3y + 5z$ is:

अगर $2^{x+y-2z} = 8^{8z-5-y}$; $5^{4y-6z} = 25^{y+z}$; $3^{4x-3z} = 9^{x+z}$ तो $2x + 3y + 5z$ का मान है:

a) 56

~~b) 44~~

c) 32

d) 28

$$2^{x+y-2z} = 2^{3(8z-5-y)}$$

$$10 + 24 + 10 = 44$$

72. Simplify $(5 \times 5 \times 5 \times 5 \times 5)^5 \times (5 \times 5 \times 5)^5 \div 5 = (125)^?$
LW $(5 \times 5 \times 5 \times 5 \times 5)^5 \times (5 \times 5 \times 5)^5 \div 5 = (125)^?$ को सरल करें।

a) 15

b) 13

c) 21

d) 14

let $? = x$

$$(5^5)^5 \times (5^3)^5 \div 5 = (5^3)^x$$

$$= \frac{5^{25} \times 5^{15}}{5} = 5^{3x}$$

$$\Rightarrow \frac{5^{40}}{5} = 5^{3x}$$

$$\Rightarrow \frac{39}{13} = 3x$$

$$\sqrt{\frac{9^2(q^1 + q^2 + q^3 + q^4 + q^5)}{\quad}} = 9$$

73. Find the value of $\left(\frac{9^3+9^4+9^5+9^6+9^7}{9^1+9^2+9^3+9^4+9^5}\right)^{\frac{1}{2}}$

$\left(\frac{9^3+9^4+9^5+9^6+9^7}{9^1+9^2+9^3+9^4+9^5}\right)^{\frac{1}{2}}$ का मान ज्ञात करें।

- a) 81 ~~b) 9~~ c) 729 d) 3

coaching center

$$3^a = 3^{3b} = 3^{4c}$$

$$\frac{a}{12} = \frac{3b}{4} = \frac{4c}{3}$$

$$\begin{cases} a = 12x \\ b = 4x \\ c = 3x \end{cases}$$

$$\begin{aligned} 144x &= 144 \\ x &= 1 \end{aligned}$$

74. If $3^a = 27^b = 81^c$ and $abc = 144$, then the value of $12 \left(\frac{1}{a} + \frac{1}{2b} + \frac{1}{5c} \right)$ is:

यदि $3^a = 27^b = 81^c$ और $abc = 144$,

तो $12 \left(\frac{1}{a} + \frac{1}{2b} + \frac{1}{5c} \right)$ का मान है:

a) $\frac{17}{120}$
c) $\frac{18}{120}$

b) $\frac{18}{10}$
d) $\frac{33}{10}$

$$\begin{aligned} & 12 \left(\frac{1}{12} + \frac{1}{8} + \frac{1}{15} \right) \\ &= \cancel{12}x \frac{10+15+8}{\cancel{120}} = 3.3 \end{aligned}$$

75. Select the number that will come in place of the question mark (?) in the mathematical statement.

(HW)

$$(0.064)^{123} \div 0.16^{47} \times 0.4^{34} \times 0.4^{29} = (0.4)^?$$

निम्न समीकरण में प्रश्न चिह्न (?) के स्थान पर कौन-सी संख्या आ सकती है?

$$(0.064)^{123} \div 0.16^{47} \times 0.4^{34} \times 0.4^{29} = (0.4)^?$$

- a) 350 b) 320 ~~c) 338~~ d) 341

$$\begin{aligned} & (.4^3)^{123} \div (.4^2)^{47} \times (.4)^{34} \times (.4)^{29} \\ &= .4^{369} \div .4^{94} \times .4^{34} \times .4^{29} \\ &= .4^{369+34+29-94} = .4^{338} = (.4)^? \\ &\Rightarrow ? = 338 \end{aligned}$$

$$A \times B = \frac{0.02 \times 0.02 \times 0.09 \times 2}{50 \times 2 \times 3 \times 10 \times 4 \times 1000000} =$$

$$= \frac{6}{10^8}$$

$$= 6 \times 10^{-8}$$

$$= 60 \times 10^{-9}$$

$$\frac{6 \times 10}{10^8}$$

76. If $A = \frac{\sqrt{0.0004} \times \sqrt[3]{0.000008}}{\sqrt[4]{16000} \times \sqrt[3]{125000} \times \sqrt[4]{810}}$ and $B = \frac{\sqrt[3]{0.729} \times \sqrt[4]{0.0016}}{\sqrt{0.16}}$, then what is $A \times B$?

अगर

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

$$6 \times \frac{1}{3} = 2$$

और $B = \frac{\sqrt[3]{0.729} \times \sqrt[4]{0.0016}}{\sqrt{0.16}}$ तो $A \times B$

$$\frac{6 \times 1}{4} = 1.5$$

क्या है?

a) 7×10^{-7}

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

~~c) 6×10^{-8}~~

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

$$\sqrt[4]{a} \times \sqrt[4]{b} = \sqrt[4]{a \times b}$$

Comparison of surds

(करणीओं की तुलना)

coaching center

Comparison of surds:

→ multiply with LCM

1. Increasing Power

$\sqrt[3]{25}$ and $\sqrt{8}$ → $25^{\frac{1}{3} \times 2} = 25^{\frac{2}{3}}$ and $8^{\frac{1}{2} \times 3} = 8^{\frac{3}{2}}$
 $625 > 512$

→ divide by HCF

2. Decreasing Power

$5^{\frac{3}{10}}$ and $11^{\frac{2}{10}}$
 $125 > 121$

3. Squaring both sides

$6 + \sqrt{5}$ and $5 + \sqrt{11}$
 2.23 3.31

4. Observing pattern

3.31

3	11	0000
63	200	189
66	119	

Must memorize:

- $\sqrt{2} = 1.414$
- $\sqrt{3} = 1.732$
- $\sqrt{5} = 2.236$

1. Which of the following is greatest?

निम्न से सबसे बड़ा:

a) $\sqrt{2}$
 $2^{\frac{1}{2} \times 12}$

64

~~b) $\sqrt[3]{3}$
 $3^{\frac{1}{3} \times 12}$~~

81

c) $\sqrt[4]{4}$
 $4^{\frac{1}{4} \times 12}$

64

d) $\sqrt[6]{6}$
 $6^{\frac{1}{6} \times 12}$

36

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2. Find the smallest among $2^{\frac{1}{12}}, 3^{\frac{1}{18}}, 4^{\frac{1}{24}}, 6^{\frac{1}{36}}, 12^{\frac{1}{72}}$ is

$(2^{\frac{1}{12}}, 3^{\frac{1}{18}}, 4^{\frac{1}{24}}, 6^{\frac{1}{36}}, 12^{\frac{1}{72}})^{\times 72}$ में से सबसे छोटा:

a) $2^{\frac{1}{12}}$

b) $3^{\frac{1}{18}}$

c) $4^{\frac{1}{24}}$

d) $6^{\frac{1}{36}}$

~~e) $12^{\frac{1}{72}}$~~

64, 81, 64, 36, (12)

coaching center

3. The greatest one of $\sqrt{2}$, $\sqrt[3]{3}$, $\sqrt[6]{6}$, $\sqrt[5]{5}$ is

$\sqrt{2}$, $\sqrt[3]{3}$, $\sqrt[6]{6}$, $\sqrt[5]{5}$ में से सबसे बड़ा:

a) $\sqrt{2}$

~~b) $\sqrt[3]{3}$~~

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

d) $\sqrt[5]{5}$

$2^{\frac{1}{2} \times 6}$, $3^{\frac{1}{3} \times 6}$, $6^{\frac{1}{6} \times 6}$, $5^{\frac{1}{5}}$
2, 3, 6, 5
8, 9, 6
 $3^{\frac{1}{3} \times 15}$, $5^{\frac{1}{5} \times 15}$

$243 > 125$

coaching center

4. The greatest among the numbers $\sqrt[2]{8}$, $\sqrt[4]{13}$, $\sqrt[5]{16}$, $\sqrt[10]{41}$ is :
4x ($\sqrt[2]{8}$, $\sqrt[4]{13}$) ($\sqrt[5]{16}$, $\sqrt[10]{41}$) में से सबसे बड़ी संख्या है :

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

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

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

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

(64), 13

(256), 41

$8^{\frac{1}{2}}$

$16^{\frac{1}{5}}$

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

$2^{\frac{1}{5}}$

>

coaching center

5. The greatest number among 3^{50} , 4^{40} , 5^{30} and 15^{20} is
 ~~3^{50}~~ , ~~4^{40}~~ , ~~5^{30}~~ और ~~15^{20}~~ में से सबसे बड़ा कौनसा है?

a) 3^{50}

~~b) 4^{40}~~

c) 5^{30}

d) 15^{20}

243, (256), 125, 225

coaching center

6. The greatest among 2^{550} , 3^{300} , 5^{250} , 6^{200} is
 ~~2^{550}~~ , ~~3^{300}~~ , ~~5^{250}~~ , ~~6^{200}~~ में से सबसे बड़ा:

a) 2^{550}

b) 3^{300}

~~c) 5^{250}~~

d) 6^{200}

2048, 729, 3125, 1296

coaching center

7. Find the smallest among the following

निम्न में से सबसे छोटा कौनसा है?

a) $1 + 3\sqrt{2}$
(1.414)

~~b) $2 + \sqrt{10}$~~
3.16

c) $3 + \sqrt{5}$
(2.236)

d) $4 + \sqrt{3}$
(1.732)

$1 + 4.242$

5.242

5.16

5.236

5.732

$$\begin{array}{r}
 3.16 \\
 3 \overline{) 10.0000} \\
 \underline{9} \\
 61 \\
 \underline{61} \\
 626 \\
 \underline{626} \\
 3900
 \end{array}$$

18
49

$11 + 2\sqrt{10}$
(40)

10
(16)

5
(1)

$6 + 2\sqrt{5}$
20

$4 + 2\sqrt{3}$
12

2nd method

~~1~~ + 3√2

~~1~~ 2 + √10

~~3~~ + √5

~~1~~ 4 + √3

7 + 8

~~1~~ 1 + 2√10

~~5~~ 1

~~1~~ 4 + 2√3

49

>

40

1

<

12

~~2~~ + √10

~~1~~ 3 + √5

10

6 + 2√5

16

20

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