

Foundation Batch



MATHS

Surds and Indices

(घातांक एवं करणी)

Part -4

LIVE

26-11-2024 07:00PM





$(\sqrt{5} + \sqrt{4})$, $(\sqrt{7} + \sqrt{2})$, $(\sqrt{6} + \sqrt{3})$ find the value of largest and smallest number.

$(\sqrt{5} + \sqrt{4})$, $(\sqrt{7} + \sqrt{2})$, $(\sqrt{6} + \sqrt{3})$ सबसे बड़ी और सबसे छोटी संख्या का मान ज्ञात करें।

(a) $\sqrt{5} + \sqrt{4}$, $\sqrt{7} + \sqrt{2}$

(b) $\sqrt{5} + \sqrt{4}$, $\sqrt{6} + \sqrt{3}$

(c) $\sqrt{7} + \sqrt{2}$, $\sqrt{5} + \sqrt{4}$

(d) $\sqrt{6} + \sqrt{3}$, $\sqrt{7} + \sqrt{2}$

14

18

20



What is the value of $\frac{2\sqrt{10}}{\sqrt{5}+\sqrt{2}-\sqrt{7}} - \sqrt{\frac{\sqrt{5}-2}{\sqrt{5}+2}} - \frac{3}{\sqrt{7}-2}$

$\sqrt{5} + \sqrt{2} + \sqrt{5} - \sqrt{5} + 2 - \sqrt{7} - 2$
 $= \sqrt{2}$

$\frac{2\sqrt{10}}{\sqrt{5}+\sqrt{2}-\sqrt{7}} - \sqrt{\frac{\sqrt{5}-2}{\sqrt{5}+2}} - \frac{3}{\sqrt{7}-2}$ का मान क्या है?

SSC CGL Tier II 13/09/2019

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

(b) $2\sqrt{5}$ $\frac{2\sqrt{10}}{\sqrt{5}+\sqrt{2}-\sqrt{7}} \times \frac{\sqrt{5}+\sqrt{2}+\sqrt{7}}{\sqrt{5}+\sqrt{2}+\sqrt{7}}$

(c) $\sqrt{2}$ $\frac{2\sqrt{10}}{\sqrt{5}+\sqrt{2}-\sqrt{7}} \times \frac{\sqrt{5}+\sqrt{2}+\sqrt{7}}{\sqrt{5}+\sqrt{2}+\sqrt{7}}$

(d) $\sqrt{7}$ $\frac{2\sqrt{10}(\sqrt{5}+\sqrt{2}+\sqrt{7})}{(\sqrt{5}+\sqrt{2})^2 - (\sqrt{7})^2}$

$\frac{2\sqrt{10}(\sqrt{5}+\sqrt{2}+\sqrt{7})}{7+2\sqrt{10}-7}$

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

$\sqrt{\frac{(\sqrt{5}-2)^2}{5-4}}$

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

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

$\frac{3(\sqrt{7}+2)}{7-4}$

$= (\sqrt{7}+2)$



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TYPE- III



54. $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} = (a+1) + (a+b)\sqrt{35}$ then find $(a-b)$

(a) 12

(b) 2

(c) 4 $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \times \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}+\sqrt{5}}$

(d) 9

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

$$= \frac{7+5+2\sqrt{35}}{2}$$

$$\frac{12+2\sqrt{35}}{2} = \frac{2(6+\sqrt{35})}{2} = 6+\sqrt{35}$$

$$a+1=6$$

$$a=5$$

$$a+b=1$$

$$5+b=1$$

$$b=-4$$

$$a-b$$

$$5-(-4)$$

$$=9$$



55. $\frac{2+\sqrt{3}}{2-\sqrt{3}} = (a+b) + (b+1)\sqrt{3}$ find $a-b$

(a) 5

~~(b) 1~~

(c) 4

(d) 2

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

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

$$\frac{4+3+4\sqrt{3}}{(7+4\sqrt{3})}$$

$$a+b=7$$

$$a+3=7$$

$$a=4$$

$$\begin{aligned} b+1 &= 4 \\ b &= 3 \end{aligned}$$

$$a-b$$

$$4-3 = 1$$



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TYPE- IV

$$x = \sqrt{a \sqrt{a \sqrt{a \dots n \text{ बार}}}}$$

$$\text{Ans} = \underline{\underline{a^{\frac{2^n - 1}{2^n}}}}$$

$$\underline{\underline{0}} \quad \sqrt{2 \sqrt{2 \sqrt{2 \sqrt{2}}}} \quad (n=4)$$

$a=2$

$$2^{\frac{2^4 - 1}{2^4}} = 2^{\frac{16-1}{16}} = 2^{\frac{15}{16}}$$



56.

$\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7}}}}}$ Simplify the $\sqrt{\quad}$ को सरल करें।

(a) 7

(b) $7^{\frac{32}{31}}$

(c) $7^{\frac{31}{32}}$

(d) $7^{\frac{1}{32}}$

$$n=5$$
$$a=7$$

$$7^{\frac{2^5-1}{2^5}}$$

$$= 7^{\frac{32-1}{32}} = \left(7^{\frac{31}{32}}\right)$$

$$\underline{x} = \sqrt{a \sqrt{a \sqrt{a \sqrt{a \dots \infty}}}}$$

$$x = \sqrt{a x}$$

$$x^2 = a x$$

$$\rightarrow \boxed{x = a}$$



57. If $x^m = \sqrt[14]{x\sqrt{x\sqrt{x}}}$, then what is the value of m ?

यदि $x^m = \sqrt[14]{x\sqrt{x\sqrt{x}}}$, तो m का मान क्या है?

- (a) $\frac{1}{8}$
- (b) $\frac{1}{4}$
- (c) $\frac{3}{4}$
- (d) $\frac{7}{4}$

$$(x^m)^{14} = x\sqrt{x\sqrt{x}}$$

$$x^{14m}$$

$$x\sqrt{x^1 x^{1/2}}$$

$$x\sqrt{x^{3/2}}$$

$$x(x^{3/2})^{1/2}$$

$$x^1 \times x^{3/4}$$

$$x^{1+3/4}$$

$$x^{7/4}$$

$$x^{14m} = x^{7/4}$$

$$14m = \frac{7}{4} \Rightarrow m = \frac{1}{8}$$



58. $\sqrt{x \sqrt{x \sqrt{x \sqrt{x \sqrt{x \dots \infty}}}}} = ?$

(a) 0

(b) 1

(c) x

(d) $x^{1/2}$



59.

$$\sqrt{5 \sqrt{5 \sqrt{5 \sqrt{5 \sqrt{5 \sqrt{5 \dots \infty}}}}}}$$

☒ (a) 5

(b) 0

(c) $5^{1/2}$

(d) 1

$$c = \sqrt[3]{a\sqrt{bx}}$$

$$x^3 = a\sqrt{bx}$$

$$(x^3)^2 = a^2 \times bx$$

$$x^6 = a^2 b \neq$$

$$x^5 = a^2 b$$

$$x = (a^2 b)^{1/5}$$

$$x = 60.$$

$$\sqrt[3]{a \sqrt{b \sqrt[3]{a \sqrt{b \sqrt[3]{a \sqrt{b \dots \infty}}}}} = ?$$

$\times$

(a) $(ab^2)^{\frac{1}{5}}$

(b) $(a^2 b^3)^{1/5}$

~~(c)~~ $(a^2 b)^{\frac{1}{5}}$

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



61.

$$\sqrt[3]{4 \sqrt[3]{2 \sqrt[3]{4 \sqrt[3]{2 \sqrt[3]{4} - \infty}}}} = ?$$

(a) 2

(b) 4

(c) 8

(d) $2\sqrt{2}$

$$= (a^2 b)^{1/5}$$

$$(4^2 \times 2)^{1/5}$$

$$(32)^{1/5} = (2^5)^{1/5}$$

$$= 2$$



$$(49^2 \times 7)^{1/5}$$

$$((7^2)^2 \times 7^1)^{1/5}$$

$$(7^4 \times 7^1)^{1/5}$$

$$(7^5)^{1/5}$$

$$= 7$$

62.

$$\sqrt[3]{49 \sqrt{7 \sqrt[3]{49 \sqrt{7 \sqrt[3]{49 \dots \infty}}}}} = ?$$

(a) 49

(b) 7

(c) $2\sqrt{7}$

(d) $49\sqrt{7}$

$$(a^2 b)^{1/5}$$

$$\# \sqrt{a + \sqrt{a + \sqrt{a + \sqrt{a + \dots}}}} \rightarrow \infty$$

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

$$\sqrt{a - \sqrt{a - \sqrt{a - \sqrt{a - \dots}}}} \rightarrow \infty$$

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

$$\sqrt{7 + \sqrt{7 + \sqrt{7 + \dots \infty}}}$$

$$\frac{1 + \sqrt{1 + 4 \times 7}}{2}$$

$$\frac{1 + \sqrt{29}}{2}$$

$$\begin{array}{c} 30 \\ \swarrow \quad \searrow \\ 5 \times 6 \\ \text{diff} = 1 \end{array}$$

$$\text{Ans} = \textcircled{6}$$

63. $\sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots \dots \dots \infty}}}}$ Find the value of . का मान ज्ञात करें।

(1) 3

(2) 4

~~(3) 6~~

(4) 5

$$\frac{1 + \sqrt{1 + 4a}}{2}$$

$$\frac{1 + \sqrt{1 + 4 \times 30}}{2} = \frac{1 + \sqrt{121}}{2} = \frac{1 + 11}{2}$$

$$= \frac{12}{2} \textcircled{6}$$

(SSC CHSL (10+2) Tier-I (CBE))

64. It $x^2 - 20 =$

$\sqrt{20 + \sqrt{20 + \sqrt{20 + \dots \dots \text{infinite terms}}}}$ then

what is x equal to?

(a) 4

(b) 5

(c) $\sqrt{5}$

(d) $2\sqrt{5}$

CDS [2022-III]

$$x^2 - 20 = 5$$

$$x^2 = 25$$

$$x = \sqrt{25}$$

$$= 5$$

$$\frac{1 + \sqrt{1 + 4a}}{2}$$

65. Find the value of the given expression.
दिए गए व्यंजक का मान ज्ञात कीजिए।

$$\sqrt{20 - \sqrt{20 - \sqrt{20 - \sqrt{20 - \dots \infty}}}}$$

- 4 ~~(A) 4~~ 5
(B) 6
(C) 5
(D) 2

Ans = 4

$$\frac{1 + \sqrt{1 + 4 \times 1}}{2}$$

$$\frac{1 + \sqrt{5}}{2}$$

$$\frac{1 + 2.2}{2}$$

$$\sim \frac{3.2}{2} \quad (1.6)$$

66. The value of $\sqrt{1 + \sqrt{1 + \sqrt{1 + \dots}}}$ is

$\sqrt{1 + \sqrt{1 + \sqrt{1 + \dots}}}$ का मान है।

- ~~(a)~~ 1 के बराबर है Equals to 1
- ~~(b)~~ 0 और 1 के बीच है Lies between 0 and 1
- ☒ (c) 1 और 2 के बीच है Lies between 1 and 2
- (d) 2 से बड़ा है Is greater than 2

CDS [2017-II]

67. $\sqrt{42 - \sqrt{42 - \sqrt{42 - \sqrt{42 - \dots - \infty}}}} = ?$

~~(a) 6~~

(b) 7

(c) 42

(d) 0

Ans = 6

68. If $x = \sqrt[2a]{8 + \sqrt{8 + \sqrt{8 + \sqrt{8 - \dots - \infty}}}}$ and $y =$

$\sqrt[2a]{8 - \sqrt{8 - \sqrt{8 - \sqrt{8 - \dots - \infty}}}}$ then find $x - y$

(a) 0

(b) 1

(c) 8

(d) 4

$$x = \frac{1 + \sqrt{1 + 4a}}{2} \quad y = \frac{-1 + \sqrt{1 + 4a}}{2}$$

$$x - y = \frac{1 + \sqrt{1 + 4a}}{2} - \left[\frac{-1 + \sqrt{1 + 4a}}{2} \right]$$

$$\frac{1 + \sqrt{1 + 4a} + 1 - \sqrt{1 + 4a}}{2} = \frac{2}{2} = 1 \text{ (1)}$$



69. The value of $p + \sqrt{p^2 + \sqrt{p^4 + \sqrt{p^8 + \sqrt{p^{16}} \dots \infty}}}$

$p + \sqrt{p^2 + \sqrt{p^4 + \sqrt{p^8 + \sqrt{p^{16}} \dots \infty}}}$ मान ज्ञात करें।

(a) $p \left(\frac{\sqrt{5}+2}{2} \right)$

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

(c) $\frac{p}{1+\sqrt{p}}$

(d) $p \left(\frac{\sqrt{5}+1}{2} \right)$

70. If $2\sqrt{4\sqrt{2\sqrt{4\sqrt{2}}}} = 32^a$, then find the value of a

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

$$2 \left(2^{5/2}\right)^{1/2}$$

$$2^1 \times 2^{5/4}$$

$$2^2 \left(2^{9/4}\right)^{1/2}$$

$$2^2 \times 2^{9/8}$$

$$2^1 \left(2^{25/8}\right)^{1/2}$$

$2\sqrt{4\sqrt{2\sqrt{4\sqrt{2}}}} = 32^a$, तो a का मान ज्ञात करें।

- (a) $\frac{41}{160}$
 (b) $\frac{41}{80}$
 (c) 1
 (d) 2

$$(2^5)^a$$

$$2^{5a}$$

$$= \left(2^{41/16}\right)^{1/2}$$

$$= 2^{41/32} = 2^{5a}$$

$$5a = \frac{41}{32}$$

$$a = \frac{41}{160}$$



H.W

71. If $x = \sqrt[4]{4\sqrt[4]{4\sqrt[4]{4}\dots\infty}} = 32^a$ then $a = ?$

यदि $x = \sqrt[4]{4\sqrt[4]{4\sqrt[4]{4}\dots\infty}} = 32^a$, तो $a = ?$

- (a) $\frac{2}{15}$
- (b) $\frac{4}{15}$
- (c) $\frac{2}{5}$
- (d) $\frac{1}{5}$