

Foundation Batch



MATHS

Surds and Indices

(घातांक एवं करणी)

Part -3

LIVE

22-11-2024 07:00PM



$$) = \underline{a + b + 4ab}$$

$$= \underline{9} + \underline{2} \sqrt{20} \text{---} \textcircled{1}$$

$$= \underline{9} + \underline{2} \sqrt{14} \text{---} \textcircled{3}$$

$$)^2 = \underline{9} + \underline{2} \sqrt{18} \text{---} \textcircled{2}$$

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

$(\sqrt{5} + \sqrt{4}), (\sqrt{7} + \sqrt{2}), (\sqrt{6} + \sqrt{3})$ सबसे बड़ी और 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) $\sqrt{6} + \sqrt{3}, \sqrt{7} + \sqrt{2}$

$$\sqrt{a} \times \sqrt{b} = \sqrt{ab}$$

$$\sqrt{a+b}, \sqrt{c+d}, \sqrt{e+f}$$

where $(a+b) = (c+d) = (e+f)$

there लिए Surd कर Root के अन्दर वाली
संख्याओं का multiplication बस होगा
को Surd बस ही जायेगा,



Foundation Batch

MATHS



TYPE- III

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

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

$$(7+3)^2 =$$

$$\underbrace{58}_{a^2+b^2} + 2 \times \underbrace{21}_{a \times b}$$

$$7^2 + 3^2 = 58$$

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

$$(a+b)^2 - (a-b)^2 = 4ab$$

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



33. What is the square root of $+6\sqrt{7}$?

$16 + 6\sqrt{7}$ का वर्गमूल क्या है?

- (a) $4 + \sqrt{7}$**

- (b) $4 - \sqrt{7}$**

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

- (d) $3 - \sqrt{7}$**

$$\sqrt{16 + 6\sqrt{7}} = \sqrt{(a^2 + b^2) + 2 \times 3\sqrt{7}} = \sqrt{a^2 + b^2 + 2ab}$$

$$\sqrt{(3+\sqrt{7})^2} = 3+\sqrt{7}$$



34. What is the square root of $15 - 4\sqrt{14}$?

$15 - 4\sqrt{14}$ का वर्गमूल क्या है?

8+7

~~(a)~~ $2\sqrt{2} - \sqrt{7}$

18+7

~~(b)~~ $3\sqrt{2} - \sqrt{7}$

15+7

~~(c)~~ $\sqrt{15} - \sqrt{7}$

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

$5+3=8$

$$\sqrt{15 - 4\sqrt{14}}$$

$$a^2 + b^2 - 2 \times a \times b \sqrt{14} = \frac{\sqrt{2}}{\sqrt{7}}$$

$a \times b$

$$2\sqrt{2} \times \sqrt{7}$$

$$8 + 7 = 15$$

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35. If $x = \sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{7} + 4\sqrt{3}}}$ then find the value of x . Where $x > 0$

यदि $x = \sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{7} + 4\sqrt{3}}}$ तो x का मान ज्ञात करे।

जहाँ $x > 0$

(a) 2

(b) 3

(c) 4

(d) 1

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

$$\begin{aligned} 8\sqrt{(2+\sqrt{3})^2} &= 8(2+\sqrt{3}) \\ &= 16+8\sqrt{3} \\ \sqrt{16+8\sqrt{3}} &= \sqrt{(4+\sqrt{3})^2} = 4+\sqrt{3} \end{aligned}$$



36. Find the positive square root of $92 - 24\sqrt{6} - 4\sqrt{2}$.

$92 - 24\sqrt{6} - 4\sqrt{2}$ का धनात्मक वर्गमूल ज्ञात कीजिए।

36+8
44

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

(b) $8 - 2\sqrt{2}$

(c) $8 - 4\sqrt{2}$

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

$2 \times 2 \sqrt{2}$
 $2 \times \sqrt{2}$

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

$92 - 24(2 - \sqrt{2})$

$92 - 48 + 24\sqrt{2}$

$44 + 24\sqrt{2}$

$\sqrt{44 + 24\sqrt{2}}$

$2 \times 2 \sqrt{2}$

$6 \times 2 \sqrt{2}$

$\sqrt{(6 + 2\sqrt{2})^2}$

$= 6 + 2\sqrt{2}$



37. $\sqrt{28 + 10\sqrt{3}} - \sqrt{7 - 4\sqrt{3}}$ का मान किसके निकटतम है?

(a) 7.2

(b) 6.1

(c) 6.5

(d) 5.8

$$\begin{array}{c} 2 \times 5\sqrt{3} \\ \swarrow \searrow \\ 5 \times \sqrt{3} \end{array}$$

$$\begin{array}{c} 2 \times 2\sqrt{3} \\ \swarrow \searrow \\ 2 \times \sqrt{3} \end{array}$$

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

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

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

$$3+2\sqrt{3} \Rightarrow 3+2 \times 1.73$$

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$$3+3.46$$

$$= \underline{6.46}$$



38. The value of $\sqrt{5 + 2\sqrt{6}} - \frac{1}{\sqrt{5+2\sqrt{6}}}$ is :

$\sqrt{5 + 2\sqrt{6}} - \frac{1}{\sqrt{5+2\sqrt{6}}}$ का मान है:

(a) $2\sqrt{2}$

(b) $2\sqrt{3}$

(c) $1 + \sqrt{5}$

(d) $\sqrt{5} - 1$

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

$\sqrt{3 \times 2}$

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

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

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

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

$$2\sqrt{2}$$



40. $\frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}} + \frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}} = ?$

(a) 0

(b) 1

(c) 2

(d) 3

$$\frac{3\sqrt{2}(\sqrt{6}-\sqrt{3})}{3} - \frac{4\sqrt{3}(\sqrt{6}-\sqrt{2})}{4} + \frac{\sqrt{6}(\sqrt{3}-\sqrt{2})}{1}$$

$$\sqrt{12} - \sqrt{6} - (\sqrt{18} - \sqrt{6}) + \sqrt{18} - \sqrt{12}$$

$$\cancel{\sqrt{12}} - \cancel{\sqrt{6}} - \cancel{\sqrt{18}} + \cancel{\sqrt{6}} + \cancel{\sqrt{18}} - \cancel{\sqrt{12}} = 0$$



41. $\left(\frac{2}{\sqrt{6}+2} + \frac{1}{\sqrt{7}+\sqrt{6}} + \frac{1}{\sqrt{8}-\sqrt{7}} + 2 - 2\sqrt{2} \right) = ?$

(a) 0

(b) $2\sqrt{2}$ $\frac{2(\sqrt{6}-\sqrt{4})}{2} + \frac{\sqrt{7}-\sqrt{6}}{1} + \frac{\sqrt{8}+\sqrt{7}}{1} + 2 - 2\sqrt{2}$

(c) $\sqrt{2}$

(d) $2\sqrt{7}$

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

$2\sqrt{7}$

44. What is $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{2020}+\sqrt{2021}}$ equal to?

$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{2020}+\sqrt{2021}}$ किसके बराबर है?

(a) $\sqrt{2020} + 1$ $\sqrt{2021} + \sqrt{2020}$

(b) $\sqrt{2021} + 1$

(c) $\sqrt{2020} + \sqrt{2021} - 1$

(d) $\sqrt{2021} - 1$

$$\cancel{\sqrt{2}-\sqrt{1}} + \cancel{\sqrt{3}-\sqrt{2}} + \cancel{\sqrt{4}-\sqrt{3}} + \dots + \cancel{\sqrt{2021}-\sqrt{2020}}$$

$$\underline{\sqrt{2021} - \sqrt{1} = \sqrt{2021} - 1}$$

CDS [2022-I]



45. $\frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \dots - \dots - \frac{1}{\sqrt{224}+\sqrt{225}} = ?$

(a) 17 $\frac{1}{\sqrt{5}+\sqrt{4}} \quad \frac{1}{\sqrt{6}+\sqrt{5}} \quad \frac{1}{\sqrt{225}+\sqrt{224}}$

(b) 13

(c) 15

(d) 2

$\cancel{\sqrt{5}} - \cancel{\sqrt{4}} + \cancel{\sqrt{6}} - \cancel{\sqrt{5}} + \cancel{\sqrt{7}} - \cancel{\sqrt{6}} + \dots - \cancel{\sqrt{225}} - \cancel{\sqrt{224}}$

$\sqrt{225} - \sqrt{4}$

$15 - 2 = 13$

46. What is the value of

$$\frac{1}{\sqrt{13}-\sqrt{12}} + \frac{1}{\sqrt{12}-\sqrt{11}} - \frac{1}{\sqrt{11}-\sqrt{10}} + \frac{1}{\sqrt{10}-3} - \frac{1}{3-\sqrt{8}}$$

√16 (a) $\frac{1}{4-\sqrt{15}} - \frac{1}{\sqrt{15}-\sqrt{14}} + \frac{1}{\sqrt{14}-\sqrt{13}} - \frac{1}{\sqrt{13}-\sqrt{12}} + \frac{1}{\sqrt{12}-\sqrt{11}} - \frac{1}{\sqrt{11}-\sqrt{10}} + \frac{1}{\sqrt{10}-3} - \frac{1}{3-\sqrt{8}}$ का मान क्या है? **SSC CGL Tier II 29/01/2022**

(a) $4 - 2\sqrt{2}$

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

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

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

√16 + √15 - (√15 + √14) + √14 + √13 - (√13 + √12)

- (√11 + √10) + √10

√16 + √15 - √15 - √14 + √14 + √13 - √13 - √12 + √12 + √11 - (√9 + √8)

√16 - √8

- √11 - √10 + √10 + √9 - √9 - √8



47. $\sqrt{30 + 12\sqrt{6}} - \sqrt{4 + 2\sqrt{3}} - \sqrt{19 - 6\sqrt{2}} = ?$

(a) 0

(b) 1

(c) $\sqrt{3}$

(d) $\sqrt{2}$

$$\begin{aligned} & \sqrt{2 \times 6 \sqrt{6}} \\ & \sqrt{2 \times 3 \times \sqrt{6}} \\ & \sqrt{3 \times \sqrt{2}} \\ & \sqrt{3} \times \sqrt{2} \\ & \underline{2\sqrt{3} \quad 3\sqrt{2}} \end{aligned}$$

$$\sqrt{3 \times 1}$$

$$\begin{aligned} & \sqrt{2 \times 3 \sqrt{2}} \\ & \sqrt{3 \sqrt{2} \times 1} \end{aligned}$$

$$\begin{aligned} & (3\sqrt{2} + 2\sqrt{3}) - (\sqrt{3} + 1) - (3\sqrt{2} - 1) \\ & \cancel{3\sqrt{2}} + 2\sqrt{3} - \sqrt{3} - \cancel{1} - \cancel{3\sqrt{2}} + \cancel{1} \end{aligned}$$

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



48. $\frac{\sqrt{3}+1}{\sqrt{3}-1} + \frac{\sqrt{2}+1}{\sqrt{2}-1} + \frac{\sqrt{3}-1}{\sqrt{3}+1} + \frac{\sqrt{2}-1}{\sqrt{2}+1} = ?$

(a) 10

(b) 12

(c) 16

(d) 14

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

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

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

$$4 + 2 \times 3 \Rightarrow 4 + 6 = 10$$



49. $\left(\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}\right)^2 + \left(\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}\right)^2$ is equal to :

(a) 64

(b) 62

(c) 66

(d) 68

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

$$\frac{(8+2\sqrt{15})^2}{4} + \frac{(8-2\sqrt{15})^2}{4}$$

$$\frac{1}{4} \left[2(8^2 + (2\sqrt{15})^2) \right]$$

$$\frac{1}{4} [2 \times (64 + 60)]$$

$$\frac{1}{2} \left(\frac{62}{124} \right)$$

$$= 62$$



50. $(\sqrt{3} + \sqrt{2})^2 - (\sqrt{3} - \sqrt{2})^2 = ?$

(a) $4\sqrt{6}$

(b) $3\sqrt{4}$

(c) $6\sqrt{4}$

(d) $4\sqrt{3}$

$$= 4 \times \sqrt{3} \times \sqrt{2}$$
$$4\sqrt{6}$$

$$(a+b)^2 - (a-b)^2 = 4ab$$



52. If $x = 8 + 2\sqrt{15}$, then find $\sqrt{x} + \frac{2}{\sqrt{x}}$

(a) $\sqrt{8}$

(b) $4\sqrt{15}$

(c) $2\sqrt{5}$

(d) $2\sqrt{8}$

$$\sqrt{x} = \sqrt{8 + 2\sqrt{15}}$$

$\sqrt{5} \times \sqrt{3}$

$$\sqrt{x} = \sqrt{(\sqrt{5} + \sqrt{3})^2}$$
$$= \underline{\underline{\sqrt{5} + \sqrt{3}}}$$

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

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

$$\sqrt{5} + \cancel{\sqrt{3}} + \sqrt{5} - \cancel{\sqrt{3}}$$

$$\boxed{2\sqrt{5}}$$



53. If $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} = a + b\sqrt{6}$, find $a + b$

(a) 5

(b) 6

☒ (c) 7

(d) 1

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

$$= 3 + 2 + 2\sqrt{6} = a + b\sqrt{6}$$

$$5 + 2\sqrt{6} = a + b\sqrt{6}$$

$$a = 5 \quad b = 2$$

$$a + b = 5 + 2 = 7$$



Qw 39. What is the value of $\frac{2\sqrt{10}}{\sqrt{5}+\sqrt{2}-\sqrt{7}} - \sqrt{\frac{\sqrt{5}-2}{\sqrt{5}+2}} - \frac{3}{\sqrt{7}-2}$

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

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

(b) $2\sqrt{5}$

(c) $\sqrt{2}$

(d) $\sqrt{7}$