

Surds & Indices

घातांक एवं करणी



By Pushpendra Sir

Part-1



1. $x = \sqrt{56 + \sqrt{56 + \sqrt{56 + \dots \infty}}}$ **Solve it.**

2. $x = \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots \infty}}}$ **Solve it.**

3. $x = \sqrt{42 - \sqrt{42 - \sqrt{42 - \sqrt{42 \dots \infty}}}}$ **Solve it.**

6. $x = \sqrt{108 - 3 \sqrt{108 - 3 \sqrt{108 - 3 \dots \infty}}}$ **Solve it.**

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

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

$$x = \sqrt{a + b \sqrt{a + b \sqrt{a + b \sqrt{a + b \sqrt{a \dots \dots \infty}}}}} = \frac{\sqrt{4a + b^2} + b}{2}$$

$$y = \sqrt{a - b \sqrt{a - b \sqrt{a - b \sqrt{a \dots \dots \infty}}}}} = \frac{\sqrt{4a + b^2} - b}{2}$$

$$x = \sqrt{a + \sqrt{a - \sqrt{a + \sqrt{a - \sqrt{a \dots \infty}}}}} = \frac{\sqrt{4a - 3} + 1}{2}$$

$$y = \sqrt{a - \sqrt{a + \sqrt{a - \sqrt{a + \sqrt{a \dots \infty}}}}} = \frac{\sqrt{4a - 3} - 1}{2}$$

$$x = \sqrt{a+b} \sqrt{a-b} \sqrt{a+b} \sqrt{a-b} \sqrt{a} \dots \infty = \frac{\sqrt{4a-3b^2} + b}{2}$$

$$y = \sqrt{a-b} \sqrt{a+b} \sqrt{a-b} \sqrt{a} \dots \infty = \frac{\sqrt{4a-3b^2} - b}{2}$$

7. $x = \sqrt{31 + \sqrt{31 + \sqrt{31 + \dots \infty}}}$ **Solve it.**

8. $x = \sqrt{7 - \sqrt{7 - \sqrt{7 - \dots \infty}}}$ Solve it.

9. If $x = \sqrt{13 + \sqrt{13 + \sqrt{13 + \dots \infty}}}$

$$y = \sqrt{13 - \sqrt{13 - \sqrt{13 + \dots \infty}}}$$

Find $x - y$

(A) 0

(B) 1

(C) -1

(D) 2

10. $\sqrt{3 + 4\sqrt{3 + 4\sqrt{3 + 4\sqrt{3 + \dots \infty}}}}$ **Solve it.**

11. $\sqrt{7 - 3\sqrt{7 - 3\sqrt{7 - 3\sqrt{7 \dots \infty}}}}$ Solve it.

12. $\sqrt{13 + \sqrt{13 - \sqrt{13 + \sqrt{13 - \sqrt{13 \dots \infty}}}}}$ Solve it.

13. $\sqrt{4 - \sqrt{4 + \sqrt{4 - \sqrt{4 \dots \infty}}}}$ Solve it.

14. $\sqrt{7\sqrt{7\sqrt{7\sqrt{7}}}}$ Solve it.

16. $\sqrt{7\sqrt{7\sqrt{7}\dots\dots}} \text{ up to } 8 \text{ term}$

17. $\sqrt[3]{7 \sqrt[3]{7 \sqrt[3]{7 \sqrt[3]{7}}}}$ Solve it.

18. $\sqrt{27 \div \sqrt{27 + \sqrt{27 \div \dots \infty}}}$ Solve it.

19. $x + \sqrt{x^2 + \sqrt{x^4 + \sqrt{x^{16} \dots \infty}}}$ **Solve it.**

(A) $x^{\left(\frac{\sqrt{5}+2}{2}\right)}$

(B) $x^{\left(\frac{3+\sqrt{5}}{2}\right)}$

(C) $\frac{x}{1+\sqrt{x}}$

(D) $x^{\left(\frac{\sqrt{5}+1}{2}\right)}$

20. $x = \sqrt{2 \sqrt[3]{4 \sqrt{2 \sqrt[3]{4 \sqrt{2 \sqrt[3]{4 \dots \infty}}}}}} \text{ Solve it.}$

उलझने बढ़ती गई मैं झेलता रहा,
वक्त ने मैदान में उतारा मैं खेलता रहा,
लोग कहते रहे तु पागल हो जायेगा,
मैं सुनता रहा,

लोगों की बातों को मन में दबाये अपने सपने बुनता रहा,
लेकिन कैसे बताऊ मैं इन लोगों को की जब वक्त बदलेगा तो
मैं नहीं मेरा विश्वास बदलेगा,

फिर इन पागल लोगों का नहीं पूरा इतिहास बदलेगा।

21. $x = \sqrt{7 \sqrt[3]{49 \sqrt{7 \sqrt[3]{49 \sqrt{7 \sqrt[3]{49 \dots \infty}}}}}}$ **Solve it.**

22. $x = \sqrt{a^3 \sqrt{b \sqrt{a^3 \sqrt{b \sqrt{a \dots \infty}}}}} \text{ Solve it.}$

$(\sqrt{a} + \sqrt{b})$ & $(\sqrt{c} + \sqrt{d})$ **Condition** $a + b = c + d$

$ab > cd$, **Then** $(\sqrt{a} + \sqrt{b}) > (\sqrt{c} + \sqrt{d})$

$ab < cd$, **Then** $(\sqrt{a} + \sqrt{b}) < (\sqrt{c} + \sqrt{d})$

23. Which is correct.

(a) $(\sqrt{11} + \sqrt{7}) < (\sqrt{10} + \sqrt{8})$

(b) $(\sqrt{17} + \sqrt{11}) > (\sqrt{15} + \sqrt{13})$

24. Find the smallest number.

सबसे छोटी संख्या बताओ।

(A) $\sqrt{8} + \sqrt{5}$

(B) $\sqrt{7} + \sqrt{6}$

(C) $\sqrt{10} + \sqrt{3}$

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

तालीम नहीं दी जाती
परिंदों को उड़ानों की वह तो खुद ही
समझ जाते हैं
ऊँचाई आसमान की

25. Which is correct.

(a) $(\sqrt{5} + \sqrt{5}) > (\sqrt{7} + \sqrt{3})$

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

(c) $(\sqrt{3} + \sqrt{9}) > (\sqrt{6} + \sqrt{6})$

26. Find the smallest & greatest number.

सबसे छोटी व बड़ी संख्या ज्ञात करो?

$$(A) = \sqrt{18} + \sqrt{10}$$

$$(B) = \sqrt{36} + \sqrt{5}$$

$$(C) = \sqrt{20} + \sqrt{9}$$

$$(D) = \sqrt{45} + \sqrt{4}$$

27. Which is greatest number.

सबसे बड़ी संख्या बताओ।

$$(\sqrt{19} - \sqrt{17}), (\sqrt{13} - \sqrt{11}), (\sqrt{7} - \sqrt{5}), (\sqrt{5} - \sqrt{3})$$

28. Which one of the following is the biggest.

$\sqrt[3]{4}$, $\sqrt[4]{6}$, $\sqrt[6]{15}$ and $\sqrt[12]{245}$

(A) $\sqrt[3]{4}$

(B) $\sqrt[4]{6}$

(C) $\sqrt[6]{15}$

(D) $\sqrt[12]{245}$

29. Which one of the following is Largest.

$\sqrt[3]{6}$, $\sqrt[2]{5}$ and $\sqrt[6]{12}$

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

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

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

(D) All are equal

30. Find smallest number.

$$\sqrt[3]{3}, \sqrt[3]{4}, \sqrt[4]{10}, \sqrt[12]{150}$$

(A) $\sqrt[3]{3}$

(B) $\sqrt[12]{150}$

(C) $\sqrt[4]{10}$

(D) $\sqrt[3]{4}$

31. Which following is true?

(A) $\sqrt[3]{11} > \sqrt{7} > \sqrt[4]{45}$

(B) $\sqrt{7} > \sqrt[3]{11} > \sqrt[4]{45}$

(C) $\sqrt{7} > \sqrt[4]{45} > \sqrt[3]{11}$

(D) $\sqrt[4]{45} > \sqrt{7} > \sqrt[3]{11}$

32. $\frac{2}{\sqrt{7}+\sqrt{5}} + \frac{7}{\sqrt{12}-\sqrt{5}} - \frac{5}{\sqrt{12}-\sqrt{7}}$ **Solve it.**

(A) 5

(B) 2

(C) 1

(D) 0

33. $\frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$

Solve it.

(A) $\sqrt{3}$

(B) $3\sqrt{3}$

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

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

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

(A) 3

(B) 2

(C) 0

(D) $\sqrt{3}$

35. If $x = \sqrt{\frac{5+2\sqrt{6}}{5-2\sqrt{6}}}$, find value of $x^2 - 10x$.

(A) 1

(B) -1

(C) 2

(D) 0

36. $\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}-\sqrt{3}-\sqrt{5}}$ **Solve it.**

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

(B) $\frac{1}{\sqrt{2}}$

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

(D) None

37. $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} + \frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}+\sqrt{5}}$ **Solve it.**

(A) 12

(B) 10

(C) 0

(D) 11

38. $\frac{\sqrt{3}+1}{\sqrt{3}-1} + \frac{\sqrt{2}+1}{\sqrt{2}-1} + \frac{\sqrt{3}-1}{\sqrt{3}+1} + \frac{\sqrt{2}-1}{\sqrt{2}+1}$ **Solve it**

(A) 10

(B) 12

(C) 7

(D) 0

39. Solve $\frac{15}{\sqrt{10}+\sqrt{20}+\sqrt{40}-\sqrt{5}-\sqrt{80}}$, given $\sqrt{10} = 3.162$

$$\sqrt{5} = 2.236$$

(A) 5

(B) 4.362

(C) 5.398

(D) 6.343

40. $\sqrt{\frac{(\sqrt{12}-\sqrt{8})(\sqrt{3}+\sqrt{2})}{5+\sqrt{24}}}$ **Solve it.**

- (A) $\sqrt{6} - \sqrt{2}$
- (B) $\sqrt{6} + \sqrt{2}$
- (C) $\sqrt{6} - 2$
- (D) $2 - \sqrt{6}$

41. $\frac{(\sqrt{3}+\sqrt{5})(\sqrt{5}+\sqrt{2})}{\sqrt{2}+\sqrt{3}+\sqrt{5}}$ **Solve it**

- (A) $\sqrt{2} + \sqrt{3} + \sqrt{5}$
- (B) $\frac{3}{2}(\sqrt{2} + \sqrt{3} + \sqrt{5})$
- (C) $\frac{1}{4}(\sqrt{2} + \sqrt{3} + \sqrt{5})$
- (D) $\frac{1}{2}(\sqrt{2} + \sqrt{3} + \sqrt{5})$

42. $\sqrt{15 + \sqrt{60} + \sqrt{84} + \sqrt{140}} = \sqrt{a} + \sqrt{b} + \sqrt{c}$,
find $a + b + c$

(A) 15

(B) 10

(C) 12

(D) 8

43. $\frac{3 \times 9^{n+1} + 9 \times 3^{2n-1}}{9 \times 3^{2n} - 6 \times 9^{n-1}}$ is equal to

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

(B) $3\frac{2}{5}$

(C) $3\frac{1}{5}$

(D) 3

44. If $2^{2^x} = 16^{2^{3x}}$, find value of x

(A) -1

(B) 2

(C) 3

(D) **None**

45. $\sqrt[3]{a} = \sqrt[3]{26} + \sqrt[3]{7} + \sqrt[3]{63}$ Solve it

- (A) $a < 729$ but $a > 216$**
- (B) $a < 216$**
- (C) $a > 729$**
- (D) $a = 729$**

46. If $x^{x\sqrt{x}} = x\sqrt{x}^x$, find x .

(A) $3/4$

(B) $9/4$

(C) $7/4$

(D) None

47. If $5^{10x} = 4900$ and $2^{\sqrt{y}} = 25$

find $\frac{[5^{(x-1)}]^5}{4^{-\sqrt{y}}}$

(A) 14/5

(B) 5

(C) 14

(D) 13

48. $\sqrt[3]{2 + \sqrt{5}} + \sqrt[3]{2 - \sqrt{5}} + \sqrt{3 - 2\sqrt{2}} = ?$

(A) $\sqrt{3}$

(B) $\sqrt{2}$

(C) 2

(D) None

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

Solve it.

(A) 10

(B) 5

(C) 7

(D) 9

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50. If $25^x - 1 = 5^{2x-1} - 100$ find out x .

(A) 1

(B) 2

(C) -2

(D) -3

**51. $(3^{33} + 3^{33} + 3^{33})(2^{33} + 2^{33}) = 6^x$,
find value of x .**

(A) 34

(B) 35

(C) 33

(D) 33.5

52. If $2^{x-1} + 2^{x+1} = 1280$. Find value of x .

(A) 7

(B) 8

(C) 9

(D) 12

**53. If $5a^3b = 1280$ and $4ab^3 = 2500$.
Find ab .**

(A) 15

(B) 20

(C) 25

(D) 30

54.

$$\sqrt{4600 + \sqrt{5400 + \sqrt{12800 + \sqrt{2500 + \sqrt{3600}}}}}$$

Solve it.

(A) 69

(B) 68

(C) 70

(D) 72

दिल में है अरमान यही

कुछ कर जाये कुछ कर जाये,

सूरज सा तेज नहीं मुझमें दीपक सा जलता देखोगे,
अपनी हृद रोशन करने से तुम मुझको कब तक रोकोगे,
मैं उस माटी का वृक्ष नहीं जिसको नदियों ने सीचा है,
बंजर माटी में पलकर मैंने मृत्यू से जीवन खींचा है।

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55. $\sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{7} + 4\sqrt{3}}}$ Solve it.

(A) 3

(B) 2

(C) $\sqrt{3}$

(D) None

56. If $\sqrt{x}^{\sqrt{x}^{\sqrt{x}^{\sqrt{x}^{\dots\infty}}}}$ = 9. Find value of x .

57. If $2^{4x-1} = 4^x$, find 16^x .

(A) 3

(B) 2

(C) 4

(D) 5

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58. Which is value among 3^{200} , 2^{300} and 7^{100} is the largest?

- (A) 3200**
- (B) 2300**
- (C) 7100**
- (D) All are equal**

59. Which of the following is correct.

I. $3^{33} > 33^3$

II. $33^3 > 333$

III. $3^{33} > 333$

(A) Only I and II

(B) Only II and III

(C) Only II

(D) All I, II and III

**60. If $5^{3a+2^{2b+2}} = 189$, $5^{a+2}+2^{b-1} = 127$.
Find $4a + 3b$.**

(A) 10

(B) 5

(C) 9

(D) 8

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