- $\sqrt{2} \approx 1.414$ ✓
- $\sqrt{3} \approx 1.732$ ✓
- $\sqrt{5} \approx 2.24$ ✓
- $\sqrt{6} \approx 2.45$ ✓
- $\sqrt{10} \approx 3.16$ ✓

$\sqrt{4} = 2$ ✓

$\sqrt{3} \approx 1.732$

- **लगभग वर्गमूल** $= \sqrt{a} \pm \frac{b}{2\sqrt{a}}$

- $\sqrt{177} \approx 13 \oplus \frac{4}{2\times13} \approx 13.308$

$\sqrt{169}=13$

$\sqrt{19} \approx 4 + \frac{3}{2\times4} \approx 4.375$

$\sqrt{16}=4$ $\quad 4+\frac{3}{8}$

$$\sqrt{41} \approx 6 + \frac{5}{2 \times 6} \approx 6.417$$

$\sqrt{36} = 6$

$$\sqrt{77} \approx 9 - \frac{4^2}{2 \times 9} \approx 9 - .22$$

$$\approx 8.78 \checkmark$$

$\sqrt{81} = 9$

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$$\sqrt{93} \approx 10 - \frac{7}{2\times 10} \approx 10 - .35 \approx 9.65$$

$$\sqrt{100} = 10$$

23. The value of $\sqrt{9-2\sqrt{11-6\sqrt{2}}}$ is closest to:

$\sqrt{9-2\sqrt{11-6\sqrt{2}}}$ का मान किसके निकटतम है?

[A] 2.7

[B] 2.9

[C] 2.4 ✓

[D] 2.1

$= \sqrt{9-2(3-\sqrt{2})}$

$= \sqrt{3+2\sqrt{2}\times 1} = \sqrt{2}+1$

$\approx 1.414+1$

$\sqrt{11-6\sqrt{2}} = 3-\sqrt{2}$

$2\times 3\times\sqrt{2}$

24. 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 $x = \sqrt{-\sqrt{3} + \sqrt{3 + 8\sqrt{7 + 4\sqrt{3}}}}$, जहां $x > 0$ है, तो x का मान ज्ञात कीजिए।

[A] 2 [B] 3

[C] 4 [D] 1

$x = \sqrt{-\sqrt{3} + \sqrt{19 + 8\sqrt{3}}}$

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

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

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

25. Find the value of $\sqrt[2021]{(2\sqrt{7}-3\sqrt{3})\sqrt{55+12\sqrt{21}}}$?

$\sqrt[2021]{(2\sqrt{7}-3\sqrt{3})\sqrt{55+12\sqrt{21}}}$ का मान ज्ञात किजिए?

$2\times 3\times 2\times\sqrt{7}\times\sqrt{3}$

[A] -1

[B] 1

[C] 0

[D] 2

$\sqrt[2021]{(2\sqrt{7}-3\sqrt{3})\times(2\sqrt{7}+3\sqrt{3})}$

$28-27=5$

$=\sqrt[2021]{(28-27)}=1$

26. If $(a+b\sqrt{3})^2 = 52+30\sqrt{3}$, where a and b natural numbers, then a+b equals?

यदि $(a+b\sqrt{3})^2 = 52+30\sqrt{3}$, जहां a और b प्राकृतिक संख्याएं हैं, तो a+b बराबर है?

=5+3

(CAT 2024)

[A] 9 ✓

[B] 7

[C] 8

[D] 10

$a+b\sqrt{3} = \sqrt{52+30\sqrt{3}}$

$2\times5\times3\sqrt{3}$

$a+b\sqrt{3} = 5+3\sqrt{3}$

27. If $\sqrt{86 - 60\sqrt{2}} = a - b\sqrt{2}$, then what will be the value of $\sqrt{a^2 + b^2}$, correct to one decimal place?

यदि $\sqrt{86 - 60\sqrt{2}} = a - b\sqrt{2}$ है, तो $\sqrt{a^2 + b^2}$ का मान क्या होगा, एक दशमलव स्थान पर सही मान होगा?

(GL MAINS 2018)

[A] 8.4
[B] 7.8
[C] 8.2
[D] 7.2

$= \sqrt{36+25}$

$= \sqrt{61}$

$\sqrt{86-60\sqrt{2}} = 5\sqrt{2} - 6 = a - b\sqrt{2}$

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

$a = -6$

$b = -5$

$\sqrt{64} = 8$

$\sqrt{61} =$

Rationalisation (परिमेयकरण) ∴→

$$\frac{1}{3+2\sqrt{2}} = \frac{1}{3+2\sqrt{2}} \times \frac{3-2\sqrt{2}}{3-2\sqrt{2}} = \frac{3-2\sqrt{2}}{3^2-(2\sqrt{2})^2} = \frac{3-2\sqrt{2}}{9-8} = \frac{3-2\sqrt{2}}{1}$$

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

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

$$\frac{1}{5+2\sqrt{6}} = 5-2\sqrt{6}$$

$$\frac{1}{5\sqrt{5}+7\sqrt{2}} = \frac{5\sqrt{5}-7\sqrt{2}}{27}$$

$$\frac{1}{8-3\sqrt{7}} = 8+3\sqrt{7}$$

$$\frac{1}{7+5\sqrt{2}} = \frac{7-5\sqrt{2}}{-1} = 5\sqrt{2}-7$$

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28. If $x = 97 + 56\sqrt{3}$, then what is the value of $\sqrt[4]{x} + \frac{1}{\sqrt[4]{x}}$?

यदि $x = 97 + 56\sqrt{3}$, तो $\sqrt[4]{x} + \frac{1}{\sqrt[4]{x}}$ का मान क्या है?

(CDS 2023)

[A] 7

[B] 6

[C] 5

[D] 4

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

$\sqrt{x} = \sqrt{97+56\sqrt{3}} = 7+4\sqrt{3}$

$2 \times 7 \times 4\sqrt{3}$

$\sqrt[4]{x} = \sqrt{7+4\sqrt{3}} = 2+\sqrt{3}$

29. If $(a + b\sqrt{n})$ is the positive square root of $(29 - 12\sqrt{5})$, where a and b are integers, and n is a natural number, then the maximum possible value of (a+b+n) is?

यदि $(a + b\sqrt{n})$, $(29 - 12\sqrt{5})$ का धनात्मक वर्गमूल है, जहां a और b पूर्णांक हैं, और n एक प्राकृतिक संख्या है, तो (a+b+n) का अधिकतम संभव मान है ?

(CAT 2024)

[A] 4
[B] 6
[C] 18
[D] 22

$(a+b+n)_{max} = 18$

$-3+1+20$

$\sqrt{29-12\sqrt{5}} = 2\sqrt{5} - 3$

$2 \times 3 \times 2\sqrt{5}$

$n > 0$

$a + b\sqrt{n} = -3 + 1\cdot\sqrt{20}$

$a = -3$
$b = 1$
$n = 20$

30. If $\sqrt{10-2\sqrt{21}}+\sqrt{8+2\sqrt{15}}=\sqrt{a}+\sqrt{b}$, where a and b are positive integers, then the value of $\sqrt{ab}$ is closest to:

यदि $\sqrt{10-2\sqrt{21}}+\sqrt{8+2\sqrt{15}}=\sqrt{a}+\sqrt{b}$, जहाँ a और b धनात्मक पूर्णांक हैं, तो $\sqrt{ab}$ का मान निकटतम है:

[A] 5.9 [B] 6.8

[C] 4.6 [D] 7.2

$2\times\sqrt{7}\times\sqrt{3}$ $2\times\sqrt{5}\times\sqrt{3}$

$=\sqrt{35}$

$=$

$\sqrt{7}-\sqrt{3}+\sqrt{5}+\sqrt{3}$

$\sqrt{7}+\sqrt{5}=\sqrt{a}+\sqrt{b}$

$a=7$

$b=5$

31. The value of $\frac{1}{(9-4\sqrt{5})^2}+\frac{1}{(9+4\sqrt{5})^2}$ is:

$\frac{1}{(9-4\sqrt{5})^2}+\frac{1}{(9+4\sqrt{5})^2}$ का मान ज्ञात करे।

[A] 322 [B] 424

[C] 246 [D] 286

$= (9+4\sqrt{5})^2 + (9-4\sqrt{5})^2$

\#

$\left(\frac{1}{9-4\sqrt{5}}\right)^2 = (9+4\sqrt{5})^2$

$81-80=1$

$= 2\times(81+80)$

$= 322$

32. If x, y is a rational number and $\frac{5+\sqrt{11}}{3-2\sqrt{11}} = x + y\sqrt{11}$, then find the value of x and y ?

यदि x, y एक परिमेय संख्या है और $\frac{5+\sqrt{11}}{3-2\sqrt{11}} = x + y\sqrt{11}$ है, तो x और y का मान ज्ञात कीजिए?

[A] $x = \frac{-14}{17}, y = \frac{-13}{26}$

[B] $x = \frac{4}{13}, y = \frac{11}{17}$

[C] $x = \frac{-27}{25}, y = \frac{-11}{37}$

[D] $x = \frac{-37}{35}, y = \frac{-13}{35}$

$$\frac{5+\sqrt{11}}{3-2\sqrt{11}} \times \frac{3+2\sqrt{11}}{3+2\sqrt{11}}$$

$$\frac{37+13\sqrt{11}}{-35}$$

$$= \frac{-37}{35} - \frac{13}{35}\sqrt{11}$$

33. The value of $\frac{14}{\sqrt{43+30\sqrt{2}}}$ is closet to:

$\frac{14}{\sqrt{43+30\sqrt{2}}}$ का मान इनमें से किसके निकटतम है-

$2\times5\times3\sqrt{2}$

[A] 1.762

[A] 1.823

[D] 1.414

[D] 1.516 ✓

$$\frac{14}{5+3\sqrt{2}} = \frac{\cancel{14}^{2}}{\cancel{7}} \times \frac{(5-3\sqrt{2})}{}$$

6×1.414

$= 10-6\sqrt{2}$

$\approx 10-8.484 \approx 1.516$