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

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

Trick :→

$56 = 8 \times 7$

$(x - y) = 1$ ✓

$xy = a$ ✓

$(x + y) = \sqrt{4a + 1}$

माना $x = \sqrt{56 + \sqrt{56 + \sqrt{56 + \ldots\ldots\infty}}} = 8$

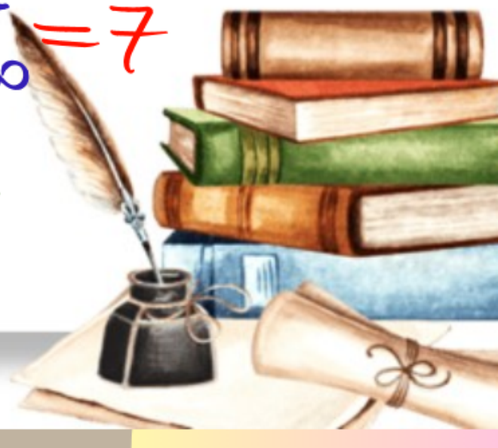
$y = \sqrt{56 - \sqrt{56 - \sqrt{56 - \ldots\ldots\infty}}} = 7$

$x - y = 1$

$8 - 7$

$x \times y = 56$

8×7



$$\sqrt{20+\sqrt{20+\sqrt{20+\cdots\infty}}} = 5$$

5×4

$$\sqrt{29+\sqrt{29+\sqrt{29+\cdots\infty}}} = \frac{\sqrt{4\times29+1}+1}{2} = \frac{3\sqrt{13}+1}{2}$$

Test RanKING

$$x = \sqrt{14+\sqrt{14+\sqrt{14+\cdots\infty}}} = \frac{\sqrt{57}+1}{2}$$

$$y = \sqrt{14-\sqrt{14-\sqrt{14-\cdots\infty}}} = \frac{\sqrt{57}-1}{2}$$

$$x-y=1 \quad , \quad xy=14$$

$$(x+y) = \sqrt{(x-y)^2+4xy}$$

$$= \sqrt{1^2+4\times 14} = \sqrt{57}$$

Test RanKING

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

$a>0$

Let $x=\sqrt{a+\sqrt{a+\sqrt{a+\ldots\ldots\ldots\infty}}}$

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

$$\Rightarrow x^2=a+x$$

$$1\cdot x^2-1\cdot x-a=0$$

$$ax^2+bx+c=0$$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

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

104. Let $x = \sqrt{272 + \sqrt{272 + \sqrt{272 + \sqrt{272 + \cdots \text{to infinity}}}}}$; then x equals

[A] 16
[B] $4\sqrt{13}$
[C] 17
[D] 4.35

$272 = 16 \times 17$

Test RanKING

105. What is the value of $2+\sqrt{2+\sqrt{2+\sqrt{2+\ \ldots\ldots}}}$?

$2+\sqrt{2+\sqrt{2+\sqrt{2+\ \ldots\ldots}}}$ का मान क्या है?

[A] 1

[B] 2

[C] 3

[D] 4

$= 2+2$

106. $\sqrt{0.56+\sqrt{0.56+\ \ldots\ldots\ldots\infty}}=?$

[A] 1.4 ^

[B] 1.2

[C] 1.3

[D] 1.1

$.56 = 1.4 \times .4$

diff = 1

107. $\sqrt{\frac{15}{4}+\sqrt{\frac{15}{4}+\sqrt{\frac{15}{4}+\ldots\ldots\ldots\infty}}}=?$

[A] 1.5

[B] 2.5

[C] 3

[D] 2.75

$\frac{5}{2}$

$\frac{15}{4}=\frac{5}{2}\times\frac{3}{2}$

diff = 1

108. $\sqrt{31 + \sqrt{31 + \sqrt{31 + \sqrt{31 + \ldots\ldots\ldots\infty}}}} = ?$

a

[A] $5\sqrt{5} - 1.5$

[B] $2.5\sqrt{5} + 0.5$

[C] $\frac{5\sqrt{5}-1}{2}$

[D] $\frac{2\sqrt{31}+1}{2}$

$$= \frac{\sqrt{4 \times 31 + 1} + 1}{2}$$

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

109. Let $x = \sqrt{42 - \sqrt{42 - \sqrt{42 - \sqrt{42 - \cdots \text{ to infinity}}}}}$; then x equals

[A] 6 [B] 7

[C] Between 6 and 7 [D] Greater than 7

$42 = 7 \times 6$

110. If $A=\sqrt{10-\sqrt{10-\sqrt{10-\sqrt{10\ldots\infty}}}}$ then which of the following is true?

यदि $A=\sqrt{10-\sqrt{10-\sqrt{10-\sqrt{10\ldots\infty}}}}$ तो निम्नलिखित में से कौन सा सत्य है?

[A] A=2.5 ✗

[B] 2.5<A<3

[C] $\frac{\sqrt{41}-3}{2}$ ✗

[D] greater than 3

$6<\sqrt{41}<7$

$A=\frac{\sqrt{4\times10+1}-1}{2}$

$A=\frac{\sqrt{41}-1}{2}$

$2.5<A<3$

111. $\dfrac{\sqrt{210+\sqrt{210+\sqrt{210+\cdots}}}}{\sqrt{156-\sqrt{156-\sqrt{156-\cdots}}}} = ?$

15×14

13×12

[A] 1

[B] 1.33

[C] 1.25

[D] 1.5

$\frac{15}{12} = \frac{5}{4}$

112. If $a=\sqrt{13+\sqrt{13+\sqrt{13+\sqrt{13\ldots\infty}}}}$ and $b=\sqrt{13-\sqrt{13-\sqrt{13-\sqrt{13\ldots\infty}}}}$, then which option is true?

यदि $a=\sqrt{13+\sqrt{13+\sqrt{13+\sqrt{13\ldots\infty}}}}$ और $b=\sqrt{13-\sqrt{13-\sqrt{13-\sqrt{13\ldots\infty}}}}$, तो कौन सा विकल्प सत्य है?

[A] $a+b+1=0$ [B] $a-b-1=0$

[C] $a-b+1=0$ [D] $a-b+1=0$

$a-b=1$

$a-b-1=0$

113. $\left(\sqrt{17+\sqrt{17+\ \ldots\ldots\ldots\infty}}\right)-\left(\sqrt{17-\sqrt{17-\ \ldots\ldots\ldots\infty}}\right)$

[A] 1

[B] 2

[C] 3

[D] None

114. If a and b are two consecutive natural numbers such that a<b, then find the value of $\sqrt{ab+\sqrt{ab+\sqrt{ab+\ \ldots\ldots\ldots\infty}}}$?

यदि a और b दो क्रमागत प्राकृत संख्याएँ हैं जहाँ a<b, तो $\sqrt{ab+\sqrt{ab+\sqrt{ab+\ \ldots\ldots\ldots\infty}}}$ का मान ज्ञात कीजिए?

[A] ab
[C] b
[C] a
[D] a+b

$a \times b$

$b-a=1$

115. $\dfrac{\sqrt{30-\sqrt{30-\sqrt{30-\cdots\ldots\infty}}}+\sqrt{30+\sqrt{30+\sqrt{30+\cdots\ldots\ldots\infty}}}}{\sqrt{30\sqrt{30\sqrt{30\ldots\ldots\ldots\infty}}}}=?$

6x5.

[A] 11/30

[B] 11/20

[C] 11/10

[D] none

$\frac{5+6}{30}$

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

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

$40 \rightarrow 8 \times 5$

$(x - y) = b$

$xy = a$

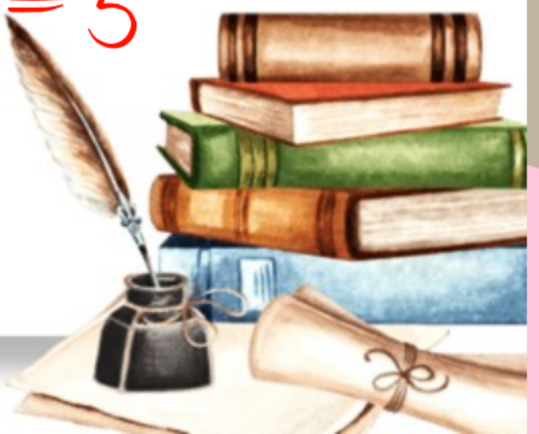
$x = \sqrt{40 + 3\sqrt{40 + 3\sqrt{40 + \ldots}}} = 8$ (a = 40, b = 3)

$y = \sqrt{40 - 3\sqrt{40 - 3\sqrt{40 - \ldots\ldots\infty}}} = 5$

$(x + y) = \sqrt{4a + b^2}$

$x - y = 3$; $8 - 5$

& $xy = 40$; 8×5



116. Find $\sqrt{154 + 3\sqrt{154 + 3\sqrt{154 + 3\sqrt{154 + \cdots \infty}}}} = ?$

a → b

[A] 13

[B] 14 ✓

[D] 11

[D] $\frac{\sqrt{613}+9}{2}$

$154 \rightarrow 14 \times 11$

117. **Find** $\sqrt{3 + 4\sqrt{3 + 4\sqrt{3 + 4\sqrt{3 + \cdots \infty}}}} = ?$

$a \quad b$

[A] $\sqrt{7} + 2$

[B] $2\sqrt{7} - 3$

[D] $2\sqrt{7}$

[D] $4 + \sqrt{7}$

$$\frac{\sqrt{4a + b^2} + b}{2}$$

$$= \frac{\sqrt{28} + 4}{2}$$

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

118. $\sqrt{750 - 5\sqrt{750 - 5\sqrt{750 \ldots\ldots\ldots \infty}}} = ?$

a b

[A] 20

[B] 25 ✓

[C] 30

[D] 10

$750 = 25 \times 30$

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

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

$x - y = 1$

$a > 0$

माना $x = \sqrt{a + \sqrt{a - \sqrt{a + \sqrt{a - \cdots}}}} \Rightarrow x = \sqrt{a+y} \Rightarrow x^2 = a + y$ — ①

घटा दो

$y = \sqrt{a - \sqrt{a + \sqrt{a - \sqrt{a + \cdots}}}} \Rightarrow y = \sqrt{a-x} \Rightarrow y^2 = a - x$

$x^2 - y^2 = x + y$

$(x-y)(x+y) = x+y$

$x - y = 1$

$y = (x-1)$

$x^2 = a + (x-1)$

$x^2 - x - (a-1) = 0$

$x = \frac{1 \pm \sqrt{1 + 4(a-1)}}{2} = \frac{1 \pm \sqrt{4a-3}}{2}$ ✓

119. Let $x=\sqrt{4+\sqrt{4-\sqrt{4+\sqrt{4-\cdots \text{to infinity}}}}}$; then x equals

[A] 3

[B] $\sqrt{13}$

[C] $\frac{\sqrt{13}-1}{2}$

[D] $\frac{\sqrt{13}+1}{2}$

$$\frac{\sqrt{4a-3}+1}{2}$$

$$=\frac{\sqrt{13}+1}{2}$$

120. Let $x=\sqrt{13\ominus\sqrt{13+\sqrt{13-\sqrt{13+\cdots\infty}}}}$; then x equals

[A] 3

[B] $\sqrt{21}$

[C] 2

[D] $\frac{\sqrt{19}+1}{2}$

$$= \frac{\sqrt{4\times13-3}-1}{2}$$

$$= \frac{7-1}{2}$$

$$= 3$$

121. माना $x = \sqrt[3]{210 + \sqrt[3]{210 + \sqrt[3]{210 + \ldots\ldots\ldots}}}$?

[A] 5 ✗

[B] 6 = x ✓

[C] 6.5

[D] 7

$$x = \sqrt[3]{210 + x}$$

फिर हल से $6 = \sqrt[3]{216}$

$6 = 6$

122. If $m = \cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\cdots\cdots}}}}$, then find m?

यदि $m = \cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\cdots\cdots}}}}$ है, तो m ज्ञात कीजिये?

[A] $\frac{\sqrt{15}-3}{2}$ [B] $\frac{\sqrt{15}+3}{2}$

[C] $\frac{\sqrt{13}+3}{2}$ [D] $\frac{\sqrt{13}-3}{2}$

$m = \frac{1}{2+\frac{1}{3+m}}$

$m = \frac{1}{7+2m}{3+m}$

$m = \frac{3+m}{7+2m}$

$m > 0$

$2m^2+6m-3=0$

$m = \frac{-6+2\sqrt{15}}{4} = \frac{-3+\sqrt{15}}{2}$

#