

$$(1! + 3! + 5! + \dots + 25!) (2! + 4! + 6! + \dots + 24!)$$

$1! = 1$ A $2! = 2$ $3! = 6$ $4! = 24$ $5! = 120$
 $AB = 6 \times 2 = 12 \Rightarrow$ اتم کمان ۲
 B اتم کمان $= 2! + 4! = 6$
 $4! = 24$
 $5! = 120$ اتم کمان ۵
 $6! = 720$ اتم کمان ۶

الف) $\sqrt[4]{(4+\sqrt{5})^2} \sqrt[4]{(1+\sqrt{5})^2} = \sqrt[4]{\frac{1}{4+\sqrt{5}} \times (1+\sqrt{5})^2} = \sqrt[4]{\frac{(1+\sqrt{5})^2}{4+\sqrt{5}}}$

$$= \sqrt[4]{\frac{1+2\sqrt{5}+5}{4+\sqrt{5}}} = \sqrt[4]{\frac{6+2\sqrt{5}}{4+\sqrt{5}}} = \sqrt[4]{2}$$

ب) $\frac{\sqrt{17}-1}{4+\sqrt{4}} + (2-\sqrt{3})^{-1} - \frac{(4-\sqrt{3})(\sqrt{17}-1)}{13} \div \frac{1}{4-\sqrt{3}} = \frac{13\sqrt{3}-13}{13} \div 2+\sqrt{3} = \frac{13(\sqrt{3}-1)}{13} \div 2+\sqrt{3}$
 $(\sqrt{3}-1)(\sqrt{3}+2) = 3\sqrt{3}+1$

الف) $\frac{\sqrt{8}+\sqrt{27}}{\omega-\sqrt{4}} - 2(\sqrt{9}-1)^{-1} = \frac{2\sqrt{2}+3\sqrt{3}}{\omega-\sqrt{4}} \times \frac{\omega+\sqrt{4}}{\omega+\sqrt{4}} = \frac{10\sqrt{2}+12\sqrt{3}+18\sqrt{3}+3\sqrt{18}}{19}$
 $= \frac{19(\sqrt{2}+\sqrt{3})}{19} = (\sqrt{3}+1) = \sqrt{2}-1$

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

ب) $\frac{\sqrt{17}-1}{4+\sqrt{4}} + (2-\sqrt{3})^{-1} = \frac{3\sqrt{3}-1}{4+\sqrt{4}} \times \frac{4-\sqrt{4}}{4-\sqrt{4}} = \frac{13(\sqrt{3}-1)}{13} \times \frac{1}{2-\sqrt{3}} \Rightarrow (\sqrt{3}-1)(2+\sqrt{3}) = 1+2\sqrt{3}$

الف) $\frac{\sqrt{1+\sqrt{3}}}{\sqrt{3}-\sqrt{2}} + \sqrt{\sqrt{3}-1} - 2 = \frac{\sqrt{1+\sqrt{3}} + \sqrt{\sqrt{3}-1}}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{2+\sqrt{4}} + \sqrt{2-\sqrt{4}}}{1} - 2$

$$\Rightarrow (\sqrt{2+\sqrt{4}} + \sqrt{2-\sqrt{4}})^2 = 4 \Rightarrow 2-2=0$$

ب) $\sqrt[4]{\sqrt{28}} \times \sqrt[4]{122} \times \sqrt[4]{502} = 2^{\frac{1}{4}} \times 2^{\frac{1}{4}} \times 3^{\frac{1}{4}} \times 2^{\frac{1}{4}} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} = \frac{1}{12} = \frac{3}{4}$
 $2\sqrt{2} \times 3 \times \sqrt[4]{2} = 6\sqrt{2}\sqrt[4]{2}$

$\frac{3^x}{2^{x-2}} + \frac{3^{x+1}}{2^{x-1}} + \frac{3^{x+2}}{2^x} + \frac{3^{x+3}}{2^{x+1}} + \frac{3^{x+4}}{2^{x+2}} = \frac{3^x(1+3+3^2+3^3+3^4)}{2^{x-2}(1+2+2^2+2^3+2^4)} = \frac{3^x(\frac{3^5-1}{2})}{2^{x-2}(2^5-1)} = \omega^2$
 $\frac{3^x}{2^{x-2}} \times \frac{3^5-1}{2(2^5-1)} = \omega^2 \Rightarrow \frac{(3^5-1)(3^x+1)}{2(2^5-1)(2^x+1)} = \frac{24 \times 28}{2 \times 2 \times 9} = \frac{24 \times 2}{9 \times 2} \Rightarrow \omega^2 \times 4(\frac{2}{9})^x$
 $\Rightarrow (\frac{2}{9})^x = \frac{9}{4} \Rightarrow x=2$

$$a = \sqrt[5]{\sqrt{4}-2}$$

$$b = \sqrt[5]{\sqrt{4}+2}$$

$$(a^5 + b^5 - 2ab)^5 (a^5 + b^5 + 2ab)^5 = t(2 - \sqrt{4}) = ((a-b)^5 (a+b)^5)^5 = (a^5 - b^5)^5$$

$$((\sqrt[5]{4}-2)^5 - (\sqrt[5]{4}+2)^5)^5 = t(2 - \sqrt{4}) \Rightarrow ((2(\sqrt{4}-\sqrt{4}))^5)^5 = 32 - 14\sqrt{4}$$

$$14(2 - \sqrt{4}) = t(2 - \sqrt{4}) \Rightarrow \underline{t = 14}$$

$$a = \sqrt[5]{\frac{2 - \sqrt{4}}{(2 - \sqrt{4})^5}} \xrightarrow{\text{U.S.}} a^5 = 2 - \sqrt{4} \rightarrow \frac{1}{a^5} = 2 + \sqrt{4}$$

$$(a + \frac{1}{a} + \sqrt{4})^5 (a + \frac{1}{a} - \sqrt{4})^5 = 2^5 \Rightarrow ((a + \frac{1}{a})^5 - 2)^5 \Rightarrow (4 - 2)^5 = 2^5$$

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

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

$$\rightarrow 4^5 = 2^5 \rightarrow 2 = 2 \rightarrow \underline{2 = 2}$$

$$A = \sqrt[5]{\frac{2 - \sqrt{4}}{(2 - \sqrt{4})^5}} (\frac{1}{t})^{-\frac{5}{5}} \Rightarrow \sqrt[5]{\frac{2 - \sqrt{4}}{(2 - \sqrt{4})^5}} (\frac{1}{t})^{-1} = \sqrt[5]{\frac{2 - \sqrt{4}}{(2 - \sqrt{4})^5}} \times \frac{1}{t} \Rightarrow A = \sqrt[5]{\frac{2 - \sqrt{4}}{(2 - \sqrt{4})^5}}$$

$$(tA)^{-\frac{1}{5}} = \sqrt[5]{\frac{1}{34}}$$

$$\sqrt[5]{a} = \sqrt[5]{2} \times a^{\frac{10}{5}} \Rightarrow \sqrt[5]{a} \times \frac{1}{a} = \sqrt[5]{2} \times a^{\frac{10}{5}} \Rightarrow a^{-\frac{4}{5}} = \sqrt[5]{2} \Rightarrow \frac{1}{a^{\frac{4}{5}}} = \sqrt[5]{2} \rightarrow a = \frac{1}{\sqrt[5]{2}}$$

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

$$\Rightarrow \frac{2(\sqrt{2} - 1)}{(1 + \sqrt{2})} = 2 \rightarrow \frac{2(\sqrt{2} - 1)}{(1 + \sqrt{2})} \times \frac{1 - \sqrt{2}}{1 - \sqrt{2}} = \frac{2(1 - 2\sqrt{2})}{-1} = 2 \Rightarrow 2 = 4 - 2\sqrt{2}$$

$$\sqrt{\frac{x+a}{A}} - \sqrt{\frac{x-b}{B}} = 1 \rightarrow A-B = 2 \xrightarrow{\text{U.S.}} (A-B)^2 = 4$$

$$\sqrt{x+a} + \sqrt{x-b} = 2 \rightarrow x - 2 = 2$$