

$$(2! + 4! + 6! + \dots + 24!) (1! + 3! + 5! + 7! + \dots + 25!) \rightarrow 4 \times 7 = 28$$

~~۲۴! + ۲۴! = ۲۴~~
۲۴

۱ + ۹ = ۷

۲۴

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

ب) $\frac{\sqrt{2+\sqrt{5}}}{2+\sqrt{10}} \times \frac{2-\sqrt{10}}{2-\sqrt{10}} = \frac{-2\sqrt{2}}{4-10} = \frac{\sqrt{2}}{3}$

$\frac{(\sqrt{2+\sqrt{5}})}{(2+\sqrt{10})} (\sqrt{2+\sqrt{5}} - \sqrt{2-\sqrt{5}}) = \frac{\sqrt{2}}{3} \times \sqrt{2} = \frac{2}{3}$

ج) $\frac{\sqrt{1+\sqrt{2}}}{5-\sqrt{9}} \times \frac{5+\sqrt{9}}{5+\sqrt{9}} = \frac{10\sqrt{2} + 10\sqrt{3} + 4\sqrt{3} + 9\sqrt{2}}{25-9} = \frac{19(\sqrt{2}+\sqrt{3})}{16} = \frac{\sqrt{2}+\sqrt{3}}{16}$

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

ه) $\frac{\sqrt{1+\sqrt{2}}}{5-\sqrt{9}} - 2(\sqrt{9}-1)^{-1} = \frac{\sqrt{2}+\sqrt{3}}{16} - \frac{\sqrt{3}+1}{2} = \frac{\sqrt{2}-1}{16}$

و) $\frac{3\sqrt{3}-1}{4+\sqrt{3}} \times \frac{4-\sqrt{3}}{4-\sqrt{3}} = \frac{12\sqrt{3}-4-9+\sqrt{3}}{16-3} = \frac{13(\sqrt{3}-1)}{13} = \sqrt{3}-1$

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

ح) $\frac{\sqrt{2\sqrt{3}-1}}{4+\sqrt{3}} + (2-\sqrt{3})^{-1} = \frac{\sqrt{2\sqrt{3}-1}}{4+\sqrt{3}} + 2+\sqrt{3} = \frac{1+2\sqrt{3}}{4+\sqrt{3}}$

ا) $\left(\frac{\sqrt{1+\sqrt{3}} + \sqrt{\sqrt{3}-1}}{\sqrt{\sqrt{3}-\sqrt{2}}} \right)^2 = \frac{1+\sqrt{3}+\sqrt{3}-1+2\sqrt{\sqrt{3}-1}}{\sqrt{3}-\sqrt{2}} \times \frac{2(\sqrt{3}+\sqrt{2})}{\sqrt{3}+\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}$

$= \frac{2(3+2+2\sqrt{6})}{3-2} = 10+4\sqrt{6}$

$\rightarrow \frac{\sqrt{1+\sqrt{3}} + \sqrt{\sqrt{3}-1}}{\sqrt{\sqrt{3}-\sqrt{2}}} = 2+\sqrt{10+4\sqrt{6}} = \sqrt{(2+\sqrt{6})^2} = 2+\sqrt{6}$

$$\begin{aligned} & \frac{r^{x+1} + r^{x+1} + r^{x+1} + r^{x+1} + r^{x+1} + r^{x+1}}{r^{x-1} + r^{x-1} + r^x + r^{x+1} + r^{x+1} + r^{x+1}} = r^x \left(\frac{r^1 - 1}{r - 1} \right) \\ & = \frac{r^x (r^1 - 1) (r^1 + 1 + r^1)}{r} = \frac{r^x (1 - 1)(1 + 1 + 1)}{r^{x-1} (1 - 1)(1 + 1 + 1)} = \frac{r^x \times 1 \times 1 \times 1}{r^{x-1} \times r^{x-1} \times r^{x-1}} \\ & \therefore \frac{r^{x-1}}{r^{x-1}} \times 1^1 = 1^1 = 1^1 \times 1^1 \Rightarrow r^{x-1} = r^{x-1} \times r^1 \Rightarrow r^{x-1} = r^{x-1} \Rightarrow x-1=0 \Rightarrow x=1 \end{aligned}$$

$$\left(a + \frac{1}{a} + \sqrt{r}\right)^p \left(a + \frac{1}{a} - \sqrt{r}\right)^p = \left(\left(a + \frac{1}{a}\right) - r\right)^p = \left(a^p + \frac{1}{a^p} + r\right)^p = a^p + \frac{1}{a^p} + r$$

$$= \sqrt[4]{19} + \frac{1}{\sqrt[4]{19}} + r = \sqrt[4]{19} + \frac{\sqrt[4]{19}}{19} + r = \frac{\sqrt[4]{19} + \sqrt[4]{19}}{19} + r = \frac{2\sqrt[4]{19}}{19} + r = \frac{2}{19}\sqrt[4]{19} + r$$

$$r = \frac{19}{2} - \frac{2}{19}\sqrt[4]{19}$$

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$$\mu \sqrt{x+a} \frac{1}{\sqrt{\mu}} = a \frac{1}{\sqrt{\mu}} \Rightarrow \mu \sqrt{x+a} = a$$

$$\Rightarrow \mu \sqrt{x+a} = a^{-1/\mu} \Rightarrow a^{-1/\mu} = \mu \Rightarrow a = \frac{1}{\mu \sqrt{\mu}}$$

$$\left(\frac{1}{a} - \mu \right) = \frac{\mu \sqrt{\mu} - \mu}{1 + \sqrt{\mu}} = \frac{\mu (\sqrt{\mu} - 1)}{\sqrt{\mu} + 1} \times \frac{\sqrt{\mu} - 1}{\sqrt{\mu} - 1}$$

$$= \frac{\mu (\mu + 1 - \mu \sqrt{\mu})}{\mu - 1} = \frac{\mu - \mu \sqrt{\mu}}{\mu - 1} = \boxed{\frac{\mu - \mu \sqrt{\mu}}{\mu - 1}}$$

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

$$\Rightarrow \sqrt{x+a} - \sqrt{x-\mu} - \mu = 0$$

$$\Rightarrow \sqrt{x+a} = \sqrt{x-\mu} - \mu + \mu \sqrt{x-\mu}$$

$$= \mu \sqrt{x-\mu}$$

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