

از ۵! به بعد جابجایی وجود دارد - ۵! یکسان معنی شد

$$(1! + 2! + 3! + \dots + 25!) (2! + 4! + 6! + \dots + 24!) \xrightarrow{\text{یکان کی عبارت}} 7 \times 7 = 49 \quad \text{پ}$$

یکان هنر

الف) $\sqrt[4]{(4+\sqrt{7})^{-1}} \sqrt{1+\sqrt{7}} = \sqrt[4]{(4+\sqrt{7})^{-1} (1+\sqrt{7}+2\sqrt{7})} = \sqrt[4]{\frac{2(4+\sqrt{7})}{4+\sqrt{7}}} = \sqrt[4]{2}$ -۲

ب) $\left(\frac{\sqrt{2}+\sqrt{5}}{\sqrt{10}+2} \right) \left(\sqrt{2-\sqrt{5}} - \sqrt{2+\sqrt{5}} \right) = \frac{\sqrt{2}+\sqrt{5}}{\sqrt{2}(\sqrt{2}+\sqrt{5})} \times \sqrt{2} (\sqrt{2-\sqrt{5}} - \sqrt{2+\sqrt{5}}) =$

$$\frac{\sqrt{2-\sqrt{5}} - \sqrt{2+\sqrt{5}}}{2} = \frac{(\sqrt{5}-1) - (\sqrt{5}+1)}{2} = \frac{-2}{2} = -1 \quad \text{پ}$$

الف) $\frac{\sqrt{8}+\sqrt{27}}{5-\sqrt{6}} - 2(\sqrt[4]{9}-1)^{-1} = \frac{2\sqrt{2}+3\sqrt{3}}{5\sqrt{6}} - \frac{2}{\sqrt{3}-1}$ گویای کنیم

$$\frac{(2\sqrt{2}+3\sqrt{3})(5\sqrt{6})}{19} - (\sqrt{3}+1) = \frac{10\sqrt{2}+15\sqrt{3}+15\sqrt{6}+9\sqrt{2}}{19} - (\sqrt{3}+1) =$$

$$\sqrt{2} + \sqrt{3} - \sqrt{3} - 1 = \sqrt{2} - 1 \quad \text{پ}$$

ب) $\frac{2\sqrt{3}-1}{4+\sqrt{3}} + (2-\sqrt{3})^{-1}$ گویای کنیم

$$\frac{(2\sqrt{3}-1)(4-\sqrt{3})}{13} + 2+\sqrt{3} = \frac{8\sqrt{3}-4-9+\sqrt{3}+2+\sqrt{3}}{13} = \frac{12\sqrt{3}-11}{13} = \sqrt{3}-1 + \sqrt{3}+2 = 2\sqrt{3}+1 \quad \text{پ}$$

الف) $\frac{\sqrt{1+\sqrt{3}} + \sqrt{\sqrt{3}-1}}{\sqrt{\sqrt{3}-\sqrt{2}}} = \frac{\sqrt{(1+\sqrt{3})(\sqrt{3}+\sqrt{2})} + \sqrt{(\sqrt{3}-1)(\sqrt{3}+\sqrt{2})}}{\sqrt{3}-2}$ -۳

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

ب) $\sqrt[4]{2^8} \times \sqrt[4]{16^2} \times \sqrt[4]{4^9} = 2^{\frac{8}{4}} \times 2^{\frac{16}{4}} \times 2^{\frac{18}{4}} = 2^4 \times 2^4 \times 2^{\frac{9}{2}} = 2^4 \times 2^4 \times 2^{\frac{9}{2}} = 2^{\frac{16}{2} + \frac{8}{2} + \frac{9}{2}} = 2^{\frac{33}{2}} = 2^{16.5} = 2^{16} \times 2^{0.5} = 2^{16} \times \sqrt{2}$

$$\frac{r^x \left(\frac{r^4-1}{r-1} \right)}{r^{x-1} \left(\frac{r^4-1}{r-1} \right)} = \Delta r \longrightarrow \frac{r^x \left(\frac{r^4-1}{r} \right)}{r^{x-1} \times r} = \Delta r$$

$$\longrightarrow \frac{r^x \times \cancel{r^4} \times \cancel{1}}{r^{x-1} \times \cancel{r^4} \times \cancel{1}} = \cancel{\Delta r} \longrightarrow r^x = r \times r^{x-1} \longrightarrow r^{x-1} = r^{x-1} \longrightarrow \boxed{x=2}$$

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

$$(a^r + b^r - rab)^r (a^r + b^r + rab)^r = t (r - \sqrt{r})$$

$$\begin{aligned} (a-b)^5 (a+b)^5 &= (a^r - b^r)^5 = \left(\sqrt[5]{r} (\sqrt{r}-\sqrt{r}) - \sqrt[5]{r} (\sqrt{r}+\sqrt{r}) \right)^5 \\ &= \left(\sqrt[5]{r} (\sqrt{r}-\sqrt{r} - \sqrt{r}-\sqrt{r}) \right)^5 = r (\sqrt{r}-\sqrt{r}+\sqrt{r}+\sqrt{r}-2) = r (2\sqrt{r}-2)^5 \\ &= 1 \left(\frac{r+1-2\sqrt{r}}{2\sqrt{r}} \right) = 14 (r-\sqrt{r}) = t (r-\sqrt{r}) \longrightarrow \boxed{t=14} \end{aligned}$$

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

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

$$b = \sqrt{r-\sqrt{r}}$$

$$b = \left(\left(a + \frac{1}{a} \right)^r - r \right)^r = \left(\underbrace{a^r + \frac{1}{a^r}}_{\frac{a^{5r}+1}{a^r}} + r - r \right)^r$$

$$\longrightarrow \left(\frac{r-2\sqrt{r}+1}{r-\sqrt{r}} \right)^r = \left(\frac{2(r-\sqrt{r})}{(r-\sqrt{r})} \right)^r = 14 = r^t \longrightarrow \boxed{t=5}$$

$$A = \sqrt[5]{2\sqrt[5]{14}} \left(\frac{1}{r} \right)^{-\frac{5}{r}} = r^{\frac{r}{5}} \times r^{\frac{5}{r}} = r^r$$

$$(rA)^{-\frac{1}{r}} \longrightarrow (r \times r^r)^{-\frac{1}{r}} = \boxed{\frac{1}{r}}$$

$$\sqrt[r]{a} = r \times a^{\frac{10}{r}} \longrightarrow a^{\frac{1}{r}} = a^{\frac{10}{r}} \times r \longrightarrow a^{-r} = r \longrightarrow a^{-1} = r\sqrt{r}$$

$$\frac{\frac{1}{a}-r}{1+\sqrt{r}} = \frac{r\sqrt{r}-r}{1+\sqrt{r}} = \frac{r(\sqrt{r}-1)}{\sqrt{r}+1} = \frac{r(\sqrt{r}-1)^r}{r} = \frac{r(\sqrt{r+1}-r\sqrt{r})}{r} = \boxed{4-3\sqrt{r}}$$

$$(\sqrt{x+a} - \sqrt{x-\varepsilon})(\sqrt{x+a} + \sqrt{x-\varepsilon}) = \cancel{x+a} - \cancel{x-\varepsilon} = a + \varepsilon$$

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$$\gamma(\sqrt{x+a} + \sqrt{x-\varepsilon}) = a + \varepsilon \longrightarrow \sqrt{x+a} + \sqrt{x-\varepsilon} = \frac{a + \varepsilon}{\gamma} = \frac{a}{\gamma} + \gamma$$

$$\sqrt{x+a} + \sqrt{x-\varepsilon} - \gamma = \frac{a}{\gamma} + \gamma - \gamma = \frac{a}{\gamma}$$

$$\sqrt{1 + \sqrt{3}} + \sqrt{\sqrt{3} - 1} = A$$

۳- الف

$$A^2 = 1 + \sqrt{3} + \sqrt{3} - 1 + 2\sqrt{\sqrt{3} - 1} = 2\sqrt{3} + 2\sqrt{2}$$

$$A = \sqrt{2}(\sqrt{\sqrt{3} + \sqrt{2}})$$

$$\frac{\sqrt{2}(\sqrt{\sqrt{3} + \sqrt{2}})}{\sqrt{\sqrt{3} - \sqrt{2}}} = \sqrt{2} \sqrt{\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}} = \sqrt{2} \sqrt{\frac{(\sqrt{3} + \sqrt{2})^2}{3 - 2}} = \sqrt{2}(\sqrt{3} + \sqrt{2}) = \sqrt{4} + 2 \xrightarrow{-2} \text{عبارت} = \sqrt{4}$$