۱- در هر ۲ برابر بعد از ۵ رقم یکان صفر می شود

در فاکتوریل فرد ← $3! = 6$, $1! = 1$ ⇐ 7

در در زوج ← $2! = 2$, $4! = 24$ ⇐ 6

رقم یکان ۲ است ⇐ $6 \times 7 = 42$

۲-

الف)

$$\sqrt[4]{(4+\sqrt{7})^{-1}} \qquad \sqrt{1+\sqrt{7}}$$

$$\left(\sqrt{\tfrac{1}{2}}+\sqrt{\tfrac{7}{2}}\right)^2$$

$$\sqrt[4]{\frac{2}{(1+\sqrt{7})^2}} = \frac{\sqrt[4]{2}}{\cancel{\sqrt{1+\sqrt{7}}}} \times \cancel{\sqrt{1+\sqrt{7}}} = \sqrt[4]{2}$$

ب)

$$\left(\frac{\sqrt{3}+\sqrt{5}}{\sqrt{10}+2}\right)^2 \underbrace{\left(\sqrt{3-\sqrt{5}}-\sqrt{3+\sqrt{5}}\right)}_{A}$$

$$A^2 = 3-\cancel{\sqrt{5}}+3+\cancel{\sqrt{5}}-2\sqrt{\underbrace{9-5}_{4}} =$$

$$6-4 = 2 \longrightarrow A = \sqrt{2}$$

$$\frac{\cancel{\sqrt{2}+\sqrt{5}}}{\cancel{\sqrt{2}(\sqrt{5}+\sqrt{2})}} \times \cancel{\sqrt{2}} = \boxed{1}$$

الف) $\dfrac{\sqrt{8}+\sqrt{27}}{5-\sqrt{6}} - 2\left(\sqrt[4]{9}-1\right)^{-1}$ -3

$$\frac{(2\sqrt{2}+3\sqrt{3})(5+\sqrt{6})}{(5-\sqrt{6})(5+\sqrt{6})} - \frac{2(\sqrt{3}+1)}{(\cancel{\sqrt[4]{9}}\,\sqrt{3}-1)(\sqrt{3}+1)}$$

$$\frac{10\sqrt{2}+4\sqrt{3}+15\sqrt{3}+9\sqrt{2}}{19} = \frac{19\sqrt{2}+19\sqrt{3}}{19}$$

$$\frac{\cancel{19}(\sqrt{2}+\sqrt{3})}{\cancel{19}} = \boxed{\sqrt{2}+\sqrt{3}}$$

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

$$\boxed{-1-\sqrt{3}} \qquad \sqrt{2}+\cancel{\sqrt{3}}-\cancel{\sqrt{3}}-1$$

Arman

$\boxed{\sqrt{2}-1}$ جواب آخر

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ب) $$\frac{٣\sqrt{٣}-١}{٤+\sqrt{٣}} \cdot \frac{(٤-\sqrt{٣})}{(٤-\sqrt{٣})} = \frac{١٢\sqrt{٣}-٩-٤+\sqrt{٣}}{١٣}$$

$$\frac{١٣\sqrt{٣}-١٣}{١٣} = \frac{\cancel{١٣}(\sqrt{٣}-١)}{\cancel{١٣}} = \sqrt{٣}-١$$

$$\frac{١}{٢-\sqrt{٣}} \cdot \frac{(٢+\sqrt{٣})}{(٢+\sqrt{٣})} = \frac{٢+\sqrt{٣}}{١}$$

$$\sqrt{٣}-١+٢+\sqrt{٣} = ١+٢\sqrt{٣}$$

٤ـ الف) $$\frac{\sqrt{١+\sqrt{٣}}+\sqrt{\sqrt{٣}-١}}{\sqrt{\sqrt{٣}-\sqrt{٢}}}=$$

$$\sqrt{\frac{١+\sqrt{٣}}{\sqrt{٣}-\sqrt{٢}}\cdot\frac{(\sqrt{٣}+\sqrt{٢})}{(\sqrt{٣}+\sqrt{٢})}}+\sqrt{\frac{\sqrt{٣}-١}{\sqrt{٣}-\sqrt{٢}}\cdot\frac{(\sqrt{٣}+\sqrt{٢})}{(\sqrt{٣}+\sqrt{٢})}}=$$

$$\frac{\cancel{\sqrt{٣}}+\cancel{\sqrt{٢}}+٣+\sqrt{٦}}{٣-٢}+\frac{٣+\sqrt{٦}-\cancel{\sqrt{٣}}-\cancel{\sqrt{٢}}}{٣-٢}=٦+\sqrt{٦}-٢$$

$$٤+\sqrt{٦}$$

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ب) $\sqrt[2]{\sqrt[3]{2^{8}}} \times \sqrt[3]{162} \times \sqrt{4\times\sqrt{2}} =$

$\sqrt[12]{2^{13}}$

$\sqrt[12]{2^{8}}$

$2^{\frac{8}{12}} = 2^{\frac{2}{3}} \times 3\sqrt[3]{2} \times 2^{\frac{13}{12}} =$

$\sqrt[5]{3 \times 2^{\frac{1}{4}}}$

$2^{2} \times 3 = \boxed{12}$

الف) $\sqrt{8} + \sqrt{27} - 2(\sqrt[3]{9} - 1)^{-1}$ -3

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الف)

۵-

$$۳^n(\underbrace{۱+۳+۳^۲+۳^۳+۳^۴+۳^۵}_{=۳۶۴}) = ۳^n \times ۳۶۴$$

$$۲^{n-۲}(\underbrace{۱+۲+۴+\dots+۳۲}_{۶۳}) = ۲^{n-۲} \times ۶۳$$

$$\frac{۳^n \times \cancel{۳۶۴}^{۵۲}}{۲^{n-۲} \times \cancel{۶۳}_{۹}} = ۵۲ \Rightarrow \frac{۳^n}{۲^{n-۲}} = ۳^n \times \frac{۲^۲}{۲^n} = ۴\left(\frac{۳}{۲}\right)^n$$

$$۴\times\left(\frac{۳}{۲}\right)^n = ۹ \longrightarrow \left(\frac{۳}{۲}\right)^n = \frac{۹}{۴} \longrightarrow \boxed{n = ۲}$$

۶-

$$ab = \sqrt[۴]{(\sqrt{۶}-۲)(\sqrt{۶}+۲)} = \sqrt[۴]{۲}$$

$$a^۲b^۲ = \sqrt{۲}$$

$$a^۲+b^۲ = x \longrightarrow x^۲ = \underbrace{a^۴+b^۴}_{۲\sqrt{۶}} + ۲a^۲b^۲$$

$$x^۲ = ۲\sqrt{۶}+۲\sqrt{۲}$$

$$(a^۲+b^۲-۲ab)^۲(a^۲+b^۲+۲ab)^۲$$

$$[(a^۲+b^۲)^۲-(۲ab)^۲]^۲ = (\underbrace{x^۲-۴a^۲b^۲}_{۲(\sqrt{۶}-\sqrt{۲})})^۲$$

$$\Rightarrow ۴\underbrace{(\sqrt{۶}-\sqrt{۲})^۲}_{۸-۴\sqrt{۳}}$$

ct:

۱ـ درمر۲ براتق

درنا کدریل فرد

دررر زوج

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ادامه ۶ـ

$۴(۸-۴\sqrt{۳}) = ۳۲-۱۶\sqrt{۳} =$

$\boxed{۱۶(۲-\sqrt{۳})}$

$(a-b)(a+b)$

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$a = \sqrt[4]{(۲-\sqrt{۳})^۲} = \sqrt{۲-\sqrt{۳}}$

$\frac{1}{a} = \sqrt{۲+\sqrt{۳}}$

$(a+\frac{1}{a})^۲ = (۲-\cancel{\sqrt{۳}}) + (۲+\cancel{\sqrt{۳}}) + ۲\underbrace{\sqrt{(۲-\sqrt{۳})(۲+\sqrt{۳})}}_{1}$

$= ۶ \Rightarrow a+\frac{1}{a} = \sqrt{۶}$

$(\sqrt{۶}+\sqrt{۲})^۲(\sqrt{۶}-\sqrt{۲})^۲ = (\sqrt{۶}^۲ - \sqrt{۲}^۲)^۲ = ۱۶$

$۶-۲$

$۱۶ = ۲^t \rightarrow t = ۴$

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$\sqrt[5]{۴\times\sqrt[3]{۱۶}} \times (\frac{1}{۲})^{-\frac{۴}{۳}}$

$۲^{\frac{۴}{۳}}$ $۲^{\frac{۴}{۳}}$

$۲^۲ \times ۲^{\frac{۴}{۳}} = ۲^{\frac{۱۰}{۳}}$

$\sqrt[5]{۲^{\frac{۱۰}{۳}}} = ۲^{\frac{۲}{۳}} \times ۲^{\frac{۴}{۳}} = ۲^۲ = ۴$

$(۲۸)^{-\frac{1}{۳}} = (۲^۳)^{-\frac{1}{۳}} = ۲^{-1} = \boxed{\frac{1}{۲}}$

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$$\frac{a^{\frac{1}{7}}}{a^{\frac{15}{7}}} = \frac{27\, a^{\frac{15}{7}}}{a^{\frac{15}{7}}}$$

$$a^{-\frac{14}{7}} = 27 \rightarrow a^{-2} = 27 \rightarrow a^{2} = \frac{1}{27}$$

$$a = \frac{1}{\sqrt{27}} = \frac{1}{3\sqrt{3}}$$

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

$$\frac{6\sqrt{3} - 12}{-2} = \boxed{6 - 3\sqrt{3}} \qquad \sqrt{27}$$

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$$(\sqrt{x+a} + \sqrt{x-4})\underbrace{(\sqrt{x+a} - \sqrt{x-4})}_{2}$$

$$= x + a - x + 4$$

$$a + 4 = 2(\sqrt{x+a} + \sqrt{x-4})$$

$$\sqrt{x+a} + \sqrt{x-4} = \frac{a+4}{2} - 2 =$$

$$\frac{4 + a - 4}{2} = \boxed{\frac{a}{2}}$$