

$$\frac{r^2 (r^2 + r^2 + r^2 + r^2)}{r^2 (r^{-1} + r^{-1} + r^{-1} + r^{-1})} = 4r$$

⑤

$$\left(\sqrt{a^2 - r} \right)^2 + \left(\sqrt{a^2 + r} \right)^2 - r \left(\sqrt{a^2 - r} \right) \left(\sqrt{a^2 + r} \right) = t (r - \sqrt{r})$$

⑥

③

$$\sqrt{a^2 - r} + \sqrt{a^2 + r} =$$

$$a = \sqrt{a^2 - r} \quad \left| \left(a + \frac{1}{a} + \sqrt{r} \right) \left(a - \frac{1}{a} - \sqrt{r} \right) = r \right. \\ \left. \left(a + \frac{1}{a} + \sqrt{r} \right) - \left(a + \frac{1}{a} - \sqrt{r} \right) = \right.$$

⑦

$$(rA)^{-\frac{1}{2}} = \frac{1}{\sqrt{r}} \quad A = \sqrt{r} \left(\frac{1}{r} \right)^{\frac{1}{2}}$$

⑧

①

$$a = \frac{r}{a} \quad \frac{1}{a} = \frac{r}{a^2}$$

⑨

②

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

⑩

④

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

①

این عبارتهای ۵ و ۲ را با هم دارد پس از ۵ به بعد یکبار فکتوریلها صفر است پس همین است رقم یکبار آنرا فکتوریل
 به سبب کنیم!

$$1! + 3! = 1 + 4 = 5$$

$$2! + 4! = 2 + 24 = 26 \rightarrow \text{یکبار} = 4 \times 5 = 20$$

الف-۲

$$\sqrt[4]{(4+\sqrt{5})^{-1}} \times \sqrt[4]{(1+\sqrt{5})^2} = \sqrt[4]{\frac{5+1+2\sqrt{5}}{4+\sqrt{5}}} = \sqrt[4]{\frac{6+2\sqrt{5}}{4+\sqrt{5}}} = \sqrt[4]{2}$$

ب-۲

$$\frac{\sqrt{2}+\sqrt{5}}{\sqrt{10}+2} = \frac{\sqrt{2}+\sqrt{5}}{\sqrt{2}(\sqrt{5}+\sqrt{2})} = \frac{1}{\sqrt{2}}$$

$$(\sqrt{3-\sqrt{5}} - \sqrt{3+\sqrt{5}})^2 = 3-\sqrt{5} + 3+\sqrt{5} - 2\sqrt{9-5} = 4-4 = 0$$

$\xrightarrow{b^2=2} \xrightarrow{b<0} b=-\sqrt{2} \rightarrow \frac{1}{\sqrt{2}} \times (-\sqrt{2}) = -1$

الف-۳

$$\frac{\sqrt{8} + \sqrt{22}}{5 - \sqrt{4}} = \frac{2\sqrt{2} + 3\sqrt{3}}{5 - \sqrt{2}} \times \frac{5 + \sqrt{2}}{5 + \sqrt{2}} = \frac{10\sqrt{2} + 4\sqrt{3} + 15\sqrt{3} + 6\sqrt{2}}{19} = \sqrt{2} + \sqrt{3}$$

$$(\sqrt[4]{9} - 1)^2 = \frac{1}{\sqrt{3} - 1} = \frac{\sqrt{3} + 1}{2} \rightarrow \sqrt{2} + \sqrt{3} - (\sqrt{3} + 1) = \sqrt{2} - 1$$

ب-۳

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

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

$\left. \begin{array}{l} \sqrt{3} - 1 + 2 + \sqrt{3} = 2\sqrt{3} + 1 \end{array} \right\}$

٤-الف

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

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

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

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

٤-ب

$$\sqrt[3]{\sqrt[3]{\sqrt[3]{12}}} = \sqrt[3]{\frac{12}{12}} = \sqrt[3]{\frac{1}{12}}$$

$$\sqrt[3]{144} = \sqrt[3]{12 \times 12} = \sqrt[3]{12} \times \sqrt[3]{12}$$

$$\sqrt[3]{4\sqrt{2}} = (\sqrt[3]{4} \times \sqrt[3]{2})^{\frac{1}{3}} = \sqrt[3]{\frac{12}{12}}$$

$$\left(\sqrt[3]{\frac{12}{12}} + \frac{1}{2} + \frac{12}{12} \right) \times 12 = \frac{1+12+12}{12} \times 12 = 4 \times 3 = 12$$

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دنبانهندس $a=1$ و $q=3$

$$\frac{\mu^n (1 + 3 + 9 + \dots + 3^{\infty})}{\mu^{n-2} (1 + 2 + 4 + \dots + 2^{\infty})} = \frac{\mu^n \left(\frac{3^4 - 1}{2} \right)}{\mu^{n-2} \left(\frac{2^4 - 1}{1} \right)} = 52$$

دنبانهندس $a=1$ و $q=2$

$$\frac{\mu^n \times \cancel{12} \times \cancel{12} \times 4}{\cancel{12} \times \cancel{12} \times 2^n} = \left(\frac{\mu}{2} \right)^n \times \frac{\cancel{12} \times \cancel{12}}{4} = \cancel{12} \rightarrow \left(\frac{\mu}{2} \right)^n = \frac{4}{4} \rightarrow n=2$$

$$(a^2 + b^2 - 2ab)^2 = (a-b)^4$$

$$(a^2 + b^2 + 2ab)^2 = (a+b)^4 \rightarrow (a^2 - b^2)^2$$

٩

$$(\sqrt{\sqrt{4}-2} + \sqrt{\sqrt{4}+2})^2 = [\sqrt{4}-2 + \sqrt{4}+2 - 2\sqrt{4-4}]^2 = (2\sqrt{4} - 2\sqrt{2})^2$$

$$24 \quad 1 \quad 1\sqrt{12} = 32 - 14\sqrt{3} = 14(2-\sqrt{3}) \rightarrow \boxed{t=14}$$

$$\text{طبق اتحاد مزدوج} \rightarrow \left(\left(a + \frac{1}{a} \right)^2 - 2 \right)^{\frac{r}{2}} = \left(a^2 + \frac{1}{a^2} \right)^{\frac{r}{2}} = a^r + \frac{1}{a^r} + 2 \quad \checkmark$$

$$\frac{1}{v-4\sqrt{3}} \times \frac{v+4\sqrt{3}}{v+4\sqrt{3}} = \frac{v+4\sqrt{3}}{49-48} = v+4\sqrt{3}$$

$$a^{\frac{r}{2}} + \frac{1}{a^{\frac{r}{2}}} + 2 = v-4\sqrt{3} + v+4\sqrt{3} + 2 = 14 \rightarrow r^{\frac{t}{2}} = 14 \rightarrow \boxed{t=4}$$

$$A = \sqrt[10]{f^3 \times e^2} (r)^{-1(-\frac{r}{r})} = (r^2)^{\frac{1}{10}} \times r^{\frac{r}{10}} = r^{\frac{r+2}{10}} = r$$

$$rA = 1 \rightarrow (rA)^{-\frac{1}{r}} = \sqrt[r]{\frac{1}{1}} = \frac{1}{r} = \frac{1}{10}$$

$$a^{\frac{1}{v}} = rv \times a^{\frac{10}{v}} \rightarrow a^{\frac{14}{v}} \times rv = 1 \rightarrow a = \frac{1}{rv} = \frac{1}{4\sqrt{3}} = \frac{\sqrt{3}}{4}$$

$$\frac{1}{a} = \left(\frac{4}{\sqrt{3}} - r \right) = \frac{4-4\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}(4\sqrt{3}-4)}{\sqrt{3}} \times \frac{1}{1+\sqrt{3}} = \frac{3(\sqrt{3}-1)}{1+\sqrt{3}} \times \frac{1-\sqrt{3}}{1-\sqrt{3}} = \frac{3(4-4\sqrt{3})}{2} = 4-4\sqrt{3}$$

د عبارت داده شده در صورت سوال یادآور اتحاد مزدوج است ...

$$\underbrace{(\sqrt{n+a} - \sqrt{n-4})}_r \underbrace{(\sqrt{n+a} + \sqrt{n-4})}_t = n+a - n - (-4) = a+4$$

$$rt = a+4 \rightarrow t = \frac{a}{r} + r \rightarrow t-r = \frac{a}{r} + r - r = \frac{a}{r}$$