

۱۸/۲۵

$$(11 + 21 + 31 + \dots + 241)(11 + 41 + 61 + \dots + 241) =$$

(۱)

$$(1+4)(2+24)$$

$$7 \times 24 = 168$$

✓

از ۱۵ به جدول ۲ داریم عدد ۵ ساخته می شود.
پس ما قبل ۱۵ را حساب می کنیم.

اولین رقم غیر صفر از سمت راست (۲) می شود.

$$\frac{1+\sqrt{5}}{\sqrt{4+\sqrt{5}}} \xrightarrow{\text{م توان ۲}} \frac{1+\sqrt{5}}{\sqrt{4+\sqrt{5}}} \xrightarrow{\text{م توان ۲}} \frac{1+7+2\sqrt{5}}{4+\sqrt{5}}$$

(۲)

$$\frac{1+2\sqrt{5}}{4+\sqrt{5}} \rightarrow \frac{2(4+\sqrt{5})}{(4+\sqrt{5})} = 2 \rightarrow \boxed{2}$$

$$\left[\frac{\sqrt{2}+\sqrt{5}}{\sqrt{5}+\sqrt{2}} \times (\sqrt{3}-\sqrt{5} - \sqrt{3}+\sqrt{5}) \right]^2 \rightarrow$$

۱۲۵

با این صفر بچکان

$$\frac{2+5+2\sqrt{10}}{10+2+2\sqrt{10}} \times \left[3-\sqrt{5} + 3+\sqrt{5} - 2(\sqrt{9+2\sqrt{5}} - \sqrt{5}-5) \right] =$$

$$\frac{7+2\sqrt{10}}{12+2\sqrt{5}} \times (4-4) \rightarrow \frac{7+2\sqrt{10}}{2(4+2\sqrt{5})} \times 2 \rightarrow \frac{7+2\sqrt{10}}{(\sqrt{5}+1)^2} \Rightarrow \boxed{\frac{7+2\sqrt{10}}{\sqrt{5}+1}}$$

$$\frac{\sqrt{5}+\sqrt{2}}{5-\sqrt{4}} - \frac{2}{4\sqrt{9}-1} \rightarrow (\sqrt{2}+\sqrt{5}) - (\sqrt{4}+1) = \sqrt{2}-1$$

(۳)

$$\frac{2\sqrt{2}+4\sqrt{5}}{5-\sqrt{2}} \xrightarrow{(5+\sqrt{2})} \frac{10\sqrt{2}+20\sqrt{10}+20\sqrt{5}+10}{19} = \sqrt{2}+\sqrt{5}$$

(۱)

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

(۲)

$$\frac{2\sqrt{3}-1}{4+\sqrt{3}} + \frac{1}{2-\sqrt{3}} \rightarrow \sqrt{3}-1 + 2+\sqrt{3} = \boxed{1+2\sqrt{3}}$$

$$\frac{(3\sqrt{3}-1)(4-\sqrt{5})}{(4+\sqrt{3})(4-\sqrt{5})} \rightarrow \frac{12\sqrt{3}+5\sqrt{4}-9-4}{13} = \frac{12\sqrt{3}-14}{13} = \sqrt{3}-1$$

(۱)

$$\frac{1}{2-\sqrt{3}} \xrightarrow{(2+\sqrt{3})} \frac{2+\sqrt{3}}{1} \rightarrow \boxed{2+\sqrt{3}}$$

Arman

الف) $\frac{\sqrt{1+\sqrt{3}} + \sqrt{\sqrt{3}-1}}{\sqrt{3}-\sqrt{2}} - 2 + \frac{4+\sqrt{3}}{\sqrt{3}-\sqrt{2}}$ (6)

ناقص

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$$\frac{(\sqrt{3}+\sqrt{2})}{(\sqrt{3}+\sqrt{2})} \cdot \frac{\sqrt{1+\sqrt{3}} + \sqrt{\sqrt{3}-1}}{\sqrt{3}-\sqrt{2}} - 2 \rightarrow \frac{\sqrt{3}+\sqrt{2}}{1} + \frac{2+\sqrt{3}}{1} - \frac{\sqrt{3}-\sqrt{2}}{1} - 2 \rightarrow$$

ب) $\frac{4+\sqrt{3}}{\sqrt{3}-\sqrt{2}}$ (7)

ب) $\sqrt[4]{12} \times \sqrt[4]{144} \times \sqrt[4]{45} =$

$$2^{\frac{1}{4}} \times 3^{\frac{1}{4}} \times 2^{\frac{1}{4}} \times 2^{\frac{1}{4}} \times 3^{\frac{1}{4}} = 3^{\frac{1}{4}} \times 2^{\frac{3}{4}} = \boxed{12} \checkmark$$

$$\frac{2^n (1+2+2^2+2^3+2^4+2^5)}{2^{n-2} (1+2^1+2^2+2^3+2^4+2^5)} = \frac{2^n \times 31}{2^{n-2} \times 31} = 2^2 \times 2^0 = 4$$

$$\omega_2 = 13 \times 2^1 \quad \checkmark \quad 2^n \times 4 = 2^{n-2} \times 4^2 \Rightarrow \boxed{n=2}$$

a: $\sqrt[4]{4-2}$
b: $\sqrt[4]{4+2}$ } $ab = \sqrt[4]{4-2} \times \sqrt[4]{4+2} = \sqrt[4]{16} = 2$ (8)

a: $\sqrt[4]{4-2}$
b: $\sqrt[4]{4+2}$ } $a^2 + b^2 = 2 \quad [(n-rab)(n+rab)]^r \rightarrow$

$$\sqrt{4-2} + \sqrt{4+2} + \sqrt{2} - \sqrt{2} \quad \boxed{t=14}$$

$$(2\sqrt{4-2})^t = t(2-5^4) \Rightarrow 2^t + 1 - 145^2 = 34 - 145^2 = 14(2-5^4)$$

$$\left(a + \frac{1}{a} + \sqrt{2}\right)^t \left(a + \frac{1}{a} - \sqrt{2}\right)^t = 2^t$$

$$a = \sqrt{2-5^4} \rightarrow \sqrt[4]{(2-5^4)}^t$$

$$\left[\left(a + \frac{1}{a} + \sqrt{2}\right) \left(a + \frac{1}{a} - \sqrt{2}\right)\right]^t \xrightarrow{\text{مربع}} \left(a + \frac{1}{a}\right)^2 - 2 = 2^t$$

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

Arman

$$14 = (2) = 2^t$$

$$\boxed{t=14} \Rightarrow \boxed{t=14}$$

$$A = \sqrt[3]{x} \sqrt[3]{14} \times \left(\frac{1}{2}\right)^{-\frac{1}{3}} \rightarrow$$

$$x^{\frac{1}{3}} \times 14^{\frac{1}{3}} \times 2^{\frac{1}{3}} \rightarrow x^{\frac{1}{3} + \frac{1}{3} + \frac{1}{3}} = x^1$$

$$(2A)^{-\frac{1}{3}} = \frac{1}{(2A)^{\frac{1}{3}}} \rightarrow \frac{1}{(2^{\frac{1}{3}} A)^{\frac{1}{3}}} = \frac{1}{2^{\frac{1}{9}} A^{\frac{1}{9}}}$$

$$\sqrt[3]{a} = 2^{\frac{1}{3}} \times a^{\frac{1}{3}} \rightarrow a^{\frac{1}{3}} = 2^{\frac{1}{3}} \times a^{\frac{1}{3}}$$

$$\frac{1}{2^{\frac{1}{3}}} = a^{\frac{1}{3} - \frac{1}{3}} \rightarrow a^0 = \frac{1}{2^{\frac{1}{3}}} \rightarrow a = \frac{1}{2^{\frac{1}{3}}}$$

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

$$\sqrt{2+9} - \sqrt{2-9} = 2$$

$$(\sqrt{n+a} + \sqrt{n-a}) \times (\sqrt{n+a} - \sqrt{n-a}) = n+a - n+a = 2a$$

$$\frac{2+a}{2} = \frac{a}{2}$$

۲- ب

$$\underbrace{\left(\frac{\sqrt{2} + \sqrt{5}}{\sqrt{10} + 2} \right)}_a \underbrace{\left(\sqrt{3 - \sqrt{5}} - \sqrt{3 + \sqrt{5}} \right)}_b$$

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

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

$$b = \pm \sqrt{0} \rightarrow \boxed{b = 0}$$

$$ab = -\sqrt{2} \times \frac{1}{\sqrt{2}}$$

۴- الف

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

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

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

$$\rightarrow \sqrt{2} \times \sqrt{\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}}$$

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

$$\sqrt{2} \times (\sqrt{\sqrt{3} + \sqrt{2}})^2 = \sqrt{4} + 2 - 2 = \sqrt{4}$$