

از اعداد به بعد مکانها صفر اند پس قبل آن را حساب می کنیم!

$$1! + 2! + 3! + 4! = 34$$

$$1 + 2 + 6 + 24$$

(۳۷)

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(الف)

$$\frac{\sqrt{1+\sqrt{5}}}{\sqrt{4+\sqrt{5}}} \xrightarrow{\text{مبتوان}} \frac{1+\sqrt{5}+2\sqrt{5}}{4+\sqrt{5}} = \sqrt{5} \checkmark$$

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(ب)

$$\frac{\sqrt{4-2\sqrt{5}} + \sqrt{6+2\sqrt{5}} + \sqrt{18-8\sqrt{5}} - \sqrt{18+8\sqrt{5}}}{\sqrt{10} + 2}$$

(الف)

$$\frac{2\sqrt{3} + 3\sqrt{3}}{8 - \sqrt{6}} - \frac{2}{\sqrt{3}-1} \rightarrow \frac{5\sqrt{3}-1}{8\sqrt{3}-\sqrt{18}-8+\sqrt{6}}$$

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(ب)

$$\frac{\sqrt{25}-1}{4+\sqrt{3}} + \frac{1}{2-\sqrt{3}} \rightarrow \frac{4\sqrt{3}-9}{8-2\sqrt{3}} \xrightarrow{\text{مبتوان}} \frac{44\sqrt{3}-49}{28-12} = 11 \checkmark$$

(الف)

$$\xrightarrow{\text{مبتوان}} \frac{2\sqrt{3}}{\sqrt{3}-\sqrt{2}} \rightarrow \frac{2(\sqrt{3}-\sqrt{2})}{\sqrt{3}-\sqrt{2}} - 2 = 0 \checkmark$$

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(ب)

$$\xrightarrow{\text{مبتوان}} \sqrt[3]{2} \times 162 \times 16\sqrt[3]{2} = \sqrt[3]{10240} = 12 \checkmark$$

$$\frac{3^n (2+9+27+11+243)}{2^n (2^{-2} + 2^{-1} + 1 + 2+2^2+2^3)} \rightarrow \left(\frac{3}{2}\right)^n \times \frac{43}{4} = 82 \rightarrow \left(\frac{3}{2}\right)^n = \frac{48}{41} \checkmark$$

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$$(a-b)^r (a+b)^r = ((a-b)(a+b))^r (a^r - b^r)^r \quad a^r + b^r - 2a^r b^r =$$

$$\sqrt{4-r} + \sqrt{4-r} - 2(\sqrt{4-r})^r (\sqrt{4-r})^r \quad 2\sqrt{4-r} - 2(\sqrt{4-r})^r$$

$$\sqrt{(\sqrt{4-r})^r} = 2(2-\sqrt{4-r}) \quad \sqrt{4-r} - 2 \sqrt{((\sqrt{4-r})(\sqrt{4-r}))^r} = 2\sqrt{4-r} - 2\sqrt{4-r} = 0$$

$$2(\sqrt{4-r} - \sqrt{4-r}) = 2(2-\sqrt{4-r}) \quad 2 = \frac{2(\sqrt{4-r} - \sqrt{4-r})}{2-\sqrt{4-r}} \quad 2 = \frac{2(\sqrt{4-r} - \sqrt{4-r})}{2-\sqrt{4-r}} =$$

$$\frac{2\sqrt{4-r}(\sqrt{4-r}-1)}{2-\sqrt{4-r}} \checkmark$$

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

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

$$A = \sqrt[r]{r^r \sqrt[r]{r^r} \times r} (r)^{\frac{r}{r}} = \sqrt[r]{r^r \times r^r \sqrt[r]{r}} (r)^{\frac{r}{r}} = \sqrt[r]{r^r \sqrt[r]{r}} (r)^{\frac{r}{r}} =$$

$$\sqrt[r]{r^{\frac{r}{r}} r^{\frac{1}{r}}} (r)^{\frac{r}{r}} = \sqrt[r]{r^{\frac{r+1}{r}}} (r)^{\frac{r}{r}} = (r)^{\frac{r}{r}} (r)^{\frac{r}{r}} = r^r = r \rightarrow \boxed{A=r}$$

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

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

$$\frac{r\sqrt{4-r}}{4\sqrt{4-r}} \leadsto \frac{r(\sqrt{4-r}-1)}{4+\sqrt{4-r}} \times \frac{\sqrt{4-r}+1}{\sqrt{4-r}+1} \times \frac{r(\sqrt{4-r})}{r} = 4 - r\sqrt{4-r} \checkmark$$

$$\sqrt{n+4} + \sqrt{n-4} = 4 + 2\sqrt{n-4}$$

$$4 + 2\sqrt{n-4} - 4 = 2\sqrt{n-4} \checkmark$$