

$$1- (1! + 3! + 5! + \dots + 25!) (2! + 4! + 6! + \dots + 26!) - 1$$

$$1 + 6 + 120 + \dots + 25! \quad 2 + 24 + 720 + \dots + 26!$$

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همه اعداد بعد از ۵! به دلیل وجود عامل ۲ و ۵، یکانشان صفر است پس یکانش کل برانتر ۷ می باشد

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همه اعداد بعد از ۶! عامل ۲ و ۵ دارند پس یکانشان صفر است پس یکانش این برانتر ۶ است.

$$7 \times 6 = 42$$

پس یکانش ۴۲ است

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

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

$$\frac{2}{4} (3 - \sqrt{5} + 3 + \sqrt{5} - 2\sqrt{9 - 5}) = \frac{2}{4} \times 2 = 1$$

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

$$\rightarrow \frac{2\sqrt{2} + 3\sqrt{3}}{5 - \sqrt{6}} \times \frac{5 + \sqrt{6}}{5 + \sqrt{6}} = \frac{10\sqrt{2} + 15\sqrt{3} + 9\sqrt{2}}{25 - 6} = \frac{19(\sqrt{2} + \sqrt{3})}{19} =$$

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

$$\text{ب)} \frac{\sqrt{27} - 1}{4 + \sqrt{3}} + (2 - \sqrt{3})^{-1} = 2 + \sqrt{3} + \sqrt{3} - 1 = 1 + 2\sqrt{3}$$

$$\downarrow \frac{1}{2 - \sqrt{3}} \times \frac{2 + \sqrt{3}}{2 + \sqrt{3}} = \frac{2 + \sqrt{3}}{4 - 3} = 2 + \sqrt{3}$$

$$\rightarrow \frac{3\sqrt{3} - 1}{4 + \sqrt{3}} \times \frac{4 - \sqrt{3}}{4 - \sqrt{3}} = \frac{12\sqrt{3} - 9 - 4 + \sqrt{3}}{16 - 3} = \frac{13(\sqrt{3} - 1)}{13} = \sqrt{3} - 1$$

$$\text{الف) } \frac{\sqrt{1+\sqrt{3}}+\sqrt{3}-1}{\sqrt{3}-\sqrt{2}} - 2 = 2 + \sqrt{6} - 2 = \sqrt{6} \quad -\text{ف}$$

$$\text{ب) } \frac{1+\sqrt{3}+\sqrt{3}-1+2\sqrt{3}-1}{\sqrt{3}-\sqrt{2}} = \frac{2\sqrt{3}+2\sqrt{2}}{\sqrt{3}-\sqrt{2}} \Rightarrow \frac{2\sqrt{3}+2\sqrt{2}}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} =$$

$$\frac{9+2+4\sqrt{6}}{3-2} = 11+4\sqrt{6} \rightarrow \sqrt{11+4\sqrt{6}} = 2+\sqrt{6}$$

$$\text{ب) } \sqrt[3]{\sqrt[3]{2^9}} \times \sqrt[3]{16^2} \times \sqrt[3]{4^2 \sqrt[3]{2}} = \sqrt[3]{2^9} \times \sqrt[3]{2^{12}} \times \sqrt[3]{2^{10}} = \sqrt[3]{2^{31}} = 2 \times 2 = 4$$

$$\frac{2^x + 2^{x+1} + 2^{x+2} + 2^{x+3} + 2^{x+4} + 2^{x+5}}{2^{x-2} + 2^{x-1} + 2^x + 2^{x+1} + 2^{x+2} + 2^{x+3}} = 62 \Rightarrow \frac{2^x}{2^x} \left(\frac{1+2+4+8+16+32}{\frac{1}{4}+\frac{1}{2}+1+2+4+8} \right) = 62$$

$$\rightarrow \frac{2^x}{2^x} \left(\frac{63}{15} \right) = 62 \Rightarrow \frac{2^x}{2^x} \times \frac{7}{5} = 1 \Rightarrow x = 2$$

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

$$(a^4+b^4-2a^2b^2)^2 = \sqrt{9-2} + \sqrt{9} + 1 - 2\sqrt{2} = (2\sqrt{6}-2\sqrt{2})^2 = 24+8-8\sqrt{12} =$$

$$24-16\sqrt{3} = 16(2-\sqrt{3}) \Rightarrow t = 16$$

$$a = \sqrt[3]{1-\sqrt{3}} = \sqrt[3]{(2-\sqrt{3})^3} = \sqrt[3]{2-\sqrt{3}}$$

$$((a+\frac{1}{a}+\sqrt{2})(a+\frac{1}{a}-\sqrt{2}))^2 = (a^2+\frac{1}{a^2})^2 = \left(2-\sqrt{2}+\frac{1}{2-\sqrt{2}}\right)^2 = 4^2 = 16$$

$$A = \sqrt[6]{\sqrt[3]{16}} \left(\frac{1}{2}\right)^{-\frac{2}{3}} = \sqrt[6]{2^{10}} \times 2^{\frac{4}{3}} = 2^{\frac{5}{3}} \times 2^{\frac{4}{3}} = 2$$

$$(2A)^{-\frac{1}{2}} = (4)^{-\frac{1}{2}} = \left(\frac{1}{4}\right)^{\frac{1}{2}} = \frac{1}{2}$$

$$\sqrt[3]{a} = 2^{\frac{2}{3}} a^{\frac{10}{12}} \Rightarrow \frac{\sqrt[3]{a}}{\sqrt[3]{a^{10}}} = 2^{\frac{2}{3}} \Rightarrow \sqrt[3]{\frac{1}{a^9}} = 2^{\frac{2}{3}} \Rightarrow \frac{1}{a^3} = 2^2 \Rightarrow a^3 = \frac{1}{2^2}$$

$$a = \frac{1}{2^{\frac{2}{3}}} \quad \frac{1}{a} - 2 = 2\sqrt{2} - 2 \quad \frac{2\sqrt{2}-2}{1+\sqrt{2}} \times \frac{\sqrt{2}-1}{\sqrt{2}-1} = \frac{12-2\sqrt{2}}{2} = 6-\sqrt{2}$$

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Date: _____

$$\sqrt{x+a} - \sqrt{x-r} = r \longrightarrow x+a - x+r = r \left(\underbrace{\sqrt{x+a} + \sqrt{x-r}}_{\frac{a+r}{r}} \right) \quad -1.$$

$$\underbrace{\sqrt{x+r} + \sqrt{x-r}}_{\frac{a+r}{r}} - r = \frac{a+r}{r} - \frac{r}{r} = \frac{a}{r}$$