

$$\left(\frac{1}{1} + \frac{4}{1 \times 2 \times 3} + \frac{16}{1 \times 2 \times 3 \times 4 \times 5} + \dots + \frac{1}{1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7} \right) \times \left(\frac{1}{1} + \frac{4}{1 \times 2 \times 3 \times 4} + \frac{16}{1 \times 2 \times 3 \times 4 \times 5 \times 6} + \dots + \frac{1}{1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7} \right) \quad (1)$$

از اینجا به بعد یکسان می شود

$$1 \times 4 = 4$$

به هم می رسد یکسان

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به هم می رسد یکسان

$$4 \times 4 = 16 \rightarrow 2 = \text{یکسان}$$

$$\sqrt[4]{(x+\sqrt{y})^{-1}} \sqrt[4]{1+\sqrt{y}} = \sqrt[4]{\frac{x-\sqrt{y}}{9}} \times \sqrt[4]{2(x+\sqrt{y})} = \sqrt[4]{\frac{2(x+\sqrt{y})(x-\sqrt{y})}{9}} = \sqrt[4]{\frac{2(x^2-y)}{9}}$$

(الف)

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

$$1+\sqrt{y}+2\sqrt{y}=1+2\sqrt{y}$$

$$\left(\frac{\sqrt{2} \cdot \sqrt{5}}{\sqrt{10} + \sqrt{2}} \right) (\sqrt{2} - \sqrt{5}) = \frac{\sqrt{2} \cdot \sqrt{5}}{\sqrt{2} \cdot \sqrt{5}} = 1$$

10

$$\frac{\sqrt{2} + \sqrt{5}}{\sqrt{10} + \sqrt{2}} \times \frac{\sqrt{10} - \sqrt{2}}{\sqrt{10} - \sqrt{2}} = \frac{\sqrt{2} \cdot \sqrt{10} + \sqrt{5} \cdot \sqrt{10} - 2 - 5}{10 - 2} = \frac{\sqrt{2} \cdot \sqrt{10} + \sqrt{5} \cdot \sqrt{10} - 7}{8} = \frac{\sqrt{2} \cdot \sqrt{10} + \sqrt{5} \cdot \sqrt{10} - 7}{8}$$

$$(\sqrt{2} - \sqrt{5})^2 = 2 - 2\sqrt{10} + 5 = 7 - 2\sqrt{10} \rightarrow -\sqrt{2}$$

15

$$\frac{\sqrt{8} + \sqrt{27}}{8 - \sqrt{6}} = 2(\sqrt{2} - 1)^{-1} = \sqrt{2} + \sqrt{2} - 1 = \sqrt{2} - 1$$

$$\frac{1\sqrt{2} + 3\sqrt{3}}{8 - \sqrt{6}} \times \frac{8 + \sqrt{6}}{8 + \sqrt{6}} = \frac{1 \cdot \sqrt{2} \cdot 8 + 1 \cdot \sqrt{2} \cdot \sqrt{6} + 3 \cdot \sqrt{3} \cdot 8 + 3 \cdot \sqrt{3} \cdot \sqrt{6}}{64 - 6} = \frac{8\sqrt{2} + \sqrt{12} + 24\sqrt{3} + 3\sqrt{18}}{58} = \frac{8\sqrt{2} + 2\sqrt{3} + 24\sqrt{3} + 6\sqrt{2}}{58} = \frac{14\sqrt{2} + 26\sqrt{3}}{58} = \frac{7\sqrt{2} + 13\sqrt{3}}{29}$$

$$\frac{2}{\sqrt{9}-1} = \frac{2}{3-1} \times \frac{3+1}{3+1} = \frac{2(3+1)}{9-1} = \frac{8}{8} = 1$$

20

