

$$\left. \begin{aligned} (16 + 31) &= 1 + 6 = 7 \\ (216 + 41) &= 2 + 4 = 6 \end{aligned} \right\} \rightarrow \text{بعد از این رقم یکان مغف است} \\ \text{رقم یکان ۲ می شود}$$

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$$\frac{1}{(4 + \sqrt{5})^{\frac{1}{2}}} \times (1 + \sqrt{5})^{\frac{1}{2}} \Rightarrow 4 + \sqrt{5} = \frac{(1 + \sqrt{5})^2}{2}$$

$$\left(\frac{(1 + \sqrt{5})^2}{2} \right)^{\frac{1}{2}} = \frac{(1 + \sqrt{5})^{\frac{1}{2}}}{2^{\frac{1}{2}}} \rightarrow \frac{2^{\frac{1}{2}}}{(1 + \sqrt{5})^{\frac{1}{2}}} \times (1 + \sqrt{5})^{\frac{1}{2}} = 2^{\frac{1}{2}}$$

(الف)

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$$\left(\frac{\sqrt{5} + \sqrt{5}}{\sqrt{5} + 2} \right) (\sqrt{5} - \sqrt{5} - \sqrt{5} + \sqrt{5})$$

$$\checkmark \frac{\sqrt{5}}{2} [13 - \sqrt{5}]^{\frac{1}{2}} - (2 + \sqrt{5})^{\frac{1}{2}} \Rightarrow \frac{\sqrt{5} - \sqrt{5} - 2\sqrt{5} - 2}{2\sqrt{5}}$$

(ب)

$$\frac{\sqrt{5} + \sqrt{5}}{5 - \sqrt{5}} \times \frac{5 + \sqrt{5}}{5 + \sqrt{5}} = \frac{(\sqrt{5} + \sqrt{5})(5 + \sqrt{5})}{25 - 5}$$

(الف)

$$\frac{1}{2(\sqrt{5} - 1)} = \frac{1}{2\sqrt{5} - 2} \times \frac{\sqrt{5} + 1}{\sqrt{5} + 1} = \frac{\sqrt{5} + 1}{2(5 - 1)} \quad \text{عبارت} \rightarrow \frac{19\sqrt{5} - 1}{19} = \sqrt{5} - 1$$

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$$\frac{\sqrt{5} - 1}{4 + \sqrt{5}} \times \frac{4 - \sqrt{5}}{4 - \sqrt{5}} = \frac{13\sqrt{5} - 13}{13} \quad \frac{1}{2\sqrt{5}} \times \frac{2 + \sqrt{5}}{2 + \sqrt{5}} = -2 - 3$$

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$$\text{مجموع: } 13 + 13 - 13 - 2 - \sqrt{5} = 13\sqrt{5} - 15$$

$$P^2 = 1 + \sqrt{5} + \sqrt{5} - 1 + 2\sqrt{(1 + \sqrt{5})(\sqrt{5} - 1)} \Rightarrow \frac{P^2}{2} = \frac{2\sqrt{5} + 2\sqrt{5}}{\sqrt{5} - \sqrt{5}}$$

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

(الف)

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$$\sqrt[3]{\sqrt[3]{5^8}} = \sqrt[3]{5^{\frac{8}{3}}} \quad \sqrt[3]{162} = \sqrt[3]{3^5 \times 2} = 3\sqrt[3]{2}$$

(ب)

$$\sqrt[12]{5^8} \times \sqrt[12]{5^8} \times \sqrt[12]{5^8} = \sqrt[12]{5^{24}} = 5^2$$

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$$\frac{r^n (1 + r + r^2 + \dots + r^5)}{r^n (r^{-1} + r^{-1} + \dots + r^2)} = \left(\frac{r}{1} \right)^n \times \frac{35r}{\frac{6r}{r}} = 5r$$

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$$\left(\frac{r}{1} \right)^n = \frac{9}{r} \rightarrow n = 2$$

$$(a-b)^r (a+b)^r = t (r - \sqrt{r}) \quad [(a-b)(a+b)]^r = (a^2 - b^2)^r = t (r - \sqrt{r})$$

$$\left[\sqrt{r} - r - \sqrt{r} + r \right]^r = \sqrt{r} - r + \sqrt{r} + r - r\sqrt{r} - r$$

$$\frac{r\sqrt{r} - r\sqrt{r}}{1 - \sqrt{r}} = t \rightarrow \frac{r(\sqrt{r} - \sqrt{r})}{1 - \sqrt{r}} \times \frac{1 + \sqrt{r}}{1 + \sqrt{r}}$$

$$t = \frac{-r(\sqrt{r} + \sqrt{r})}{1 - r}$$

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

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

$$r\sqrt{r} + \frac{1}{r\sqrt{r}} + r = r^r \rightarrow r - r\sqrt{r} + r + \frac{1}{r\sqrt{r}} + r = 1 \quad r^r = 1 \Rightarrow t = r$$

$$A = r^{\frac{r}{r}} \times r^{\frac{r}{r}} \Rightarrow r^{\frac{r}{r}} + \frac{r}{r} = r^r$$

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

$$\sqrt[r]{a} = r\sqrt[r]{a^r}$$

$$a^{\frac{1}{r}} = r^r \times a^{\frac{1}{r}} \Rightarrow a^{\frac{1}{r}} - \frac{1}{r} = r^r \Rightarrow a^{-\frac{1}{r}} = r^r \Rightarrow \left(\frac{1}{a}\right)^r = r^r$$

$$a^{-1} = r\sqrt{r} \Rightarrow \frac{1}{a} = r\sqrt{r}$$

$$\frac{r\sqrt{r} - r}{1 + \sqrt{r}} \xrightarrow{\text{cancel } r} \frac{r(-1 + \sqrt{r})}{1 - r}$$

$$\frac{-1r + r\sqrt{r}}{-r} = \frac{-r(1 - \sqrt{r})}{-r} = 1 - r\sqrt{r}$$

$$\sqrt{n+a} - \sqrt{n-f} = r \rightarrow A - B = r$$

$$\sqrt{n+a} + \sqrt{n-f} = r \rightarrow A + B = r$$

$$\frac{A+f}{r} - r = \frac{A+f-f}{r} = \frac{A}{r}$$

$$\frac{(A-B)(A+B)}{r} = a^r - b^r \Rightarrow r(A+B) = \frac{n+a-n+f}{a+f} \rightarrow A+B = \frac{a+f}{r}$$