۱- ماهوس سوال بود

$$\begin{cases} 3^{4n-1} = 3^{-1} \\ 3^{4n-1} = \frac{1}{3} \end{cases}$$

۲- مجموع جواب های معادله $\log_{\sqrt{2}}^{4^{n+1}+18} = n+3$

$$2^{2n+4} = 4 \times 2^{2n} + 16 \rightarrow 2^{2n+4} = 2^{2n} + 16$$

$$2^{2n} - 2^{n+4} + 16 = 0 \rightarrow t^2 - 18t + 16 = 0 \rightarrow t = 8 \rightarrow 2^n = 8 \rightarrow n = \log_2^8 = 3$$
$$\hookrightarrow t = 2 \rightarrow 2^n = 2 \rightarrow n = \log_2^2 = 1$$

$$\log_2^{15} + \log_2^5 = \log_2^{75}$$

۳- $\log_{11}^{\log_2^{\log_3^{\log_4^{256}}}}$

$$\log_{11}^2 \times \log_{11}^2 + \log_{11}^{7\times11} \log_{11}^{33\times11}$$

$$(\log_{11}^3)^2 + \log_{11}^{147} \log_{11}^{1331}$$

$$(\log_{11}^2)^2 + (\log_{11}^{11} + \log_{11}^7)(\log_{11}^{11} + \log_{11}^3) \rightarrow (\log_{11}^2)^2 + (2 - \log_{11}^2)(2 + \log_{11}^3) + \log_{11}^3 - (\log_{11}^3)^2$$

$$\rightarrow 4 \qquad (1 + \log_{11}^7)(2 + \log_{11}^3)$$
$$\underbrace{\qquad}_{1 - \log_{11}^7}$$

۴- $\log_{\sqrt{2}}^{\log_2^{(x^2-3x+1)} + 2\log_2^{(1-x)}} = 0$ مقدار

$$(x^2 - 3x + 1)(1-x)^2 = 10^0 \rightarrow \underbrace{(x-1)^2}_{=(1-x)^2}(1-x)^2 = 10^0 \rightarrow (1-x)^4 = 10^0 \rightarrow 1 - x = 10 \rightarrow x = -9$$

$$\log_{\sqrt{2}}^{\log_2^{81}} = 4$$

۵- $\log_{\sqrt{2}}^{\log_2^{(x^2+3x+4)} + \log_2^{2-x}} = 2$ مقدار $\log_2^x$ ؟

$$\frac{(2-x)(x^2+3x+4)}{(2-x)^2} = 8 \rightarrow x - 2 = 2 \rightarrow x = 4$$

$$\log_2^{\log_2^4} = 1$$

۶- $\log_{\sqrt{2}}^{\log_2^{(x-2)} - \log_2^{\frac{1}{(2-x)^2}}} = 4$ مقدار $\log_2^{(-x)}$ ؟

$$(2-x)(x-2)^2 = 10^4 \rightarrow (2-x)^3 = 10^4 \rightarrow 2 - x = 10 \rightarrow x = -8$$

$$\log_2^{\log_2^8} = 4$$

۷- $\log_{\sqrt{2}}^{\log_4^{x^2-3x}} = 0$ مقدار $\log_4^{x-2}$ ؟

$$x^2 - 3x = 4^{x-2} \rightarrow x^2 - 3x - 4^{x-2} = 0 \qquad x = \frac{3 \pm \sqrt{9+16}}{2}$$

$$\rightarrow \frac{3 \pm \sqrt{25}}{2} \qquad 3 - \sqrt{25} \rightarrow \text{منفی}$$

$$3 + \sqrt{25} \rightarrow \checkmark \rightarrow \log_4^{(3+\sqrt{25}-2)} \rightarrow \frac{1}{2}$$

۸- $\log_{\sqrt{2}}^{\log_{16}^{\log_{10}^{100}}} = \frac{8}{8}$ مقدار $\log_{16}^{\log_{10}^{100}}$ ؟

$$\log_{16}^{\log_{10}^{100}} = \frac{\log_{10}^{100}}{\log_{10}^{16}} \rightarrow \frac{2\log_{10}^2}{2\log_{10}^2 + \log_{10}^2} \rightarrow \frac{2}{3} \rightarrow \frac{5}{8}$$

$$\frac{\log_{10}^2}{\log_{10}^8} = \frac{5}{8}$$

$\frac{\log 4 + \log 2}{\log 2 + \log 4 + \log 4}$

$\frac{12}{18}$

$\log_{12}^{9}$ ؟ مقدار $\log_4^3 = \frac{8}{10}$ — ۹

$\frac{1}{2}\log_2^3 = \frac{8}{10}$

$\frac{8}{a} = \frac{\log 4}{\log 2} \leftarrow \log_2^4 = \frac{14}{10}$

۱۰ — باشد مقدار $\sqrt{2}^{\frac{b}{a}}$ ؟ $(a\log 2)m^2 + am + b\log 2 = 0$ برابر ۱-

$a\log 2 + b\log 2 = a \Rightarrow \log 2 = \frac{a}{a+b}$ $\quad \log_2^{10} = \frac{b+a}{a}$

$\log_{\frac{5}{2}}^{\frac{10}{2}} = 1 + \frac{b}{a} \Rightarrow \log_2^5 - \frac{b}{a} \Rightarrow \sqrt{2}^{\log_2^5} = \sqrt{5}$