سارا ساسانی - یازدهم دختر A - تکلیف شماره ۲۴۰

۱-

$$y = x^2 \qquad f(x) = 3^{Ax+B} \quad \Big\} \xrightarrow{1,3}$$

$$1 = 3^{A+B} \Rightarrow A+B=0$$

$$9 = 3^{3A+B} \Rightarrow 3A+B=2$$

$$-A-B=0$$

$$2A = 2 \Rightarrow A=1, \quad B=-1$$

$$f(x) = 3^{x-1} \Rightarrow 3^{0-1} = 3^{-1} = \frac{1}{3}$$

۲-

$$\log_2 (4^x+15) = x+3 \Rightarrow 2^{x+3} = 4^x + 15 \Rightarrow 2^x \times 2^3 = 4^x + 15 \xrightarrow{\div 2^x}$$

$$2^3 = \underbrace{\frac{4^x}{2^x}}_{(\frac{4}{2})^x} + \frac{15}{2^x} \Rightarrow 8 = 2^x + \frac{15}{2^x} \xrightarrow{2^x = A} 8 = A + \frac{15}{A} \Rightarrow A^2 - 8A + 15 = 0$$

$$A = 3 \to 2^x = 3 \to x = \log_2 3$$

$$A = 5 \to 2^x = 5 \to x = \log_2 5$$

$$\Big\} \text{جمع} = \log_2 3 + \log_2 5 = \log_2 15$$

۳-

$$(\log_{21} 3)^2 + \log_{21} 147 \cdot \log_{21} 1323 \longrightarrow \log_{21} 147 = 2\log_{21} 21 - \log_{21} 3$$

$$\log_{21} 1323 = 2\log_{21} 21 + \log_{21} 3 \Rightarrow (2 - \log_{21} 3)(2 + \log_{21} 3) = 4 - (\log_{21} 3)^2$$

$$(\log_{21} 3)^2 + 4 - (\log_{21} 3)^2 = 4$$

۴-

$$x^2 - 2x + 1 = (x-1)^2 \Rightarrow (x-1)^2 \underbrace{(1-x)^3}_{-(x-1)} = 5 \Rightarrow -(x-1)^5 = 10^5 \Rightarrow$$

$$5 = \log_{10} 10^5$$

$$-x + 1 = 10 \Rightarrow x = -9$$

$$\log_3 9 = 2$$

۵-

$$3 = \log_2 8 \Rightarrow \underbrace{(x^2 + 2x + 4)(x-2)}_{x^3 - 2x^2 + 2x^2 - 4x + 4x - 8} = 8 \Rightarrow x^3 = 16 \Rightarrow x = \sqrt[3]{16}$$

$$\log_{\sqrt[3]{2}} \sqrt[3]{16} = 4$$

$$w = \log_{10}^{10^{w}} \xrightarrow{-(n-2)} \frac{(2-n)}{(n-2)^2} = 10^{w} \Rightarrow -(n-2)^2 = 10^{w} \Rightarrow -n+2 = 10 \Rightarrow n = -1$$ -۶

$$\log_{\sqrt{2}}^{1} = \log_{2^{\frac{1}{2}}}^{2^{w}} = 4\log_{2}^{2} = 4$$

$$2^{n^2-2} = 81^{n} \Rightarrow 2^{n^2-2} = 2^{4n} \Rightarrow n^2 - 2 = 4n \Rightarrow n^2 - 4n - 2 = 0$$ -۷

$$n = \frac{4 \pm 2\sqrt{6}}{2} \begin{cases} \nearrow 2 - \sqrt{6} \text{ غ ق ق} \\ \searrow 2 + \sqrt{6} \end{cases}$$

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

$$\log_{18}^{4} = \frac{\log_{2}^{4}}{\log_{2}^{18}} = \frac{2\log_{2}^{2}}{\log_{2}^{2} + \log_{2}^{9}} = \frac{2}{1 + \frac{5}{8}} = \frac{2}{\frac{13}{8}} = \frac{16}{13}$$ -۸

$$\log_{12}^{6} = \frac{\log_{2}^{6}}{\log_{2}^{12}} = \frac{\log_{2}^{2} + \log_{2}^{3}}{\log_{2}^{3} + \log_{2}^{4}} = \frac{1 + 0.8}{0.8 + 2} = \frac{1.8}{2.8} = \frac{9}{14}$$ -۹

$$(a\log 2)n^2 + an + b\log 2 = 0 \xrightarrow{n=-1} a\log 2 - a + b\log 2 = 0 \Rightarrow$$ -۱۰

$$b\log 2 = a - a\log 2 \Rightarrow b\log 2 = a(1 - \log 2) \Rightarrow \frac{b}{a} = \frac{1-\log 2}{\log 2} = \log_{2}^{5}$$

$$(\sqrt{2})^{\log_{2}^{5}} = 2^{\frac{1}{2}\log_{2}^{5}} = 2^{\log_{2}^{\sqrt{5}}} = \sqrt{5}^{\log_{2}^{2}} = \sqrt{5}$$