

$$f(x) = 3^{Ax+B} \rightarrow 3^{A+B} \cdot 3^1 - A+B=0$$

$$f(x) = 3^{Ax+B} \rightarrow 3^{A+B} \cdot 3^2 - 3A+B=2$$

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

$A=1$   
 $B=-1$

خاصیت لگاریتم

$$2^{x+3} = 2^{2x} + 15 \rightarrow 2^{(x+3)} \cdot 2^{2x} = 15 \rightarrow 2^x(2^3 - 2^x) = 15$$

$$2^{x-2} \cdot 2(8-2^x) = 15 \rightarrow 2^2 - 8 \cdot 2^x + 15 = 0 \rightarrow 2^x = 5, 3$$

$$\rightarrow 2^x = 5, 3 \rightarrow x = \log_2 5, \log_2 3$$

$$\left(\log_{21} 3\right)^2 + \log_{21}^{147} = \log_{21}^{1323} - \left(\log_{21} 3\right)^2 + \left(\log_{21}^{21} + \log_{21}^7\right) \left(\log_{21}^{21} + \log_{21}^3\right)$$

$$\rightarrow \log_{21}^3 = x \rightarrow x^2 + (1+1-x)(2+x) = x^2 + 4 - x^2 = 4$$

$$\log(x^2 - 2x + 1) + 3 \log(1-x) = 5 \rightarrow x-1 = t \rightarrow \log t^2 + 3 \log 2 - t = 5$$

$$t^2 - t^3 = 10^5 \rightarrow -t^5 = 10^5 \rightarrow t = -10 \rightarrow x-1 = -10$$

$$\rightarrow x = -9 \rightarrow \log_3^{-9} = \log_3^9 = 2$$

$$\log_2(x^2 + 2x + 4) + \log_2(x-2) = 3 \rightarrow (x^2 + 2x + 4)(x-2) = x^3 - 8 = 2^3$$

$$\rightarrow x^3 = 16 \rightarrow x = \sqrt[3]{16} = \log_3 \sqrt[3]{16} = 4$$

$$\log(2-x) - \log \frac{1}{(x-2)^2} = 3 \rightarrow 2-x-t - t \alpha (-t)^2 = 10^3$$

$$\rightarrow t^3 \cdot 10^3 - t \cdot 10 - 2-x \cdot 10 \rightarrow x = -8$$

$$\rightarrow \log \frac{8}{\sqrt{2}} = 2 \log_2 8 = \textcircled{6}$$

$$x^2 = 2 \rightarrow 81^x \rightarrow \frac{x^2-2}{3} = \frac{4x}{3} \rightarrow x^2 - 2 \cdot 4x - x^2 - 4x - 2 = 0$$

$$\rightarrow x = \frac{4 \pm \sqrt{24}}{2} = 2 \pm \sqrt{6} \rightarrow \log(2 + \sqrt{6} - 2)$$

$$\rightarrow \log \sqrt{6} = \textcircled{\frac{1}{2}}$$

$$\log_3^2 \frac{5}{8} \rightarrow \frac{\log 2 \cdot 5}{\log 3} = \frac{5}{8} / \log_{18}^8 = \frac{\log 8}{\log 18} = \frac{3 \log 2}{2 \log 3 + \log 2}$$

$$\rightarrow \frac{3(5)}{2(8) + 5} = \frac{15}{21} = \textcircled{\frac{5}{7}}$$

$$\log_4^3 \frac{8}{10} = \frac{\log 3}{2 \log 2} = \frac{4}{5} \rightarrow \log_{12}^6 = \frac{\log 6}{\log 12} = \frac{\log 2 + \log 3}{2 \log 2 + \log 3}$$

$$\rightarrow \frac{(\frac{5}{2}) + 4}{5 + 4} = \frac{6.5}{9} = \textcircled{\frac{13}{18}}$$

$$(a \log 2) x^2 + a x + b \log 2 = 0 \rightarrow \text{صورتها} = -1 + x = \frac{-a}{a \log 2} = -\frac{1}{\log 2}$$

$$\text{ضرب انتها} = -1 \cdot x = \frac{b \log 2}{a \log 2} = \frac{b}{a}$$

$$\rightarrow x = -\log_{\sqrt{2}} 10 + 1 \rightarrow \frac{b}{a} = -1 + \log_{\sqrt{2}} 10$$

$$\rightarrow \frac{1}{\sqrt{2}} = \frac{\sqrt{10}}{\sqrt{2}} = \textcircled{\sqrt{5}}$$