$(x-2)^2 = (2-x)^2 \rightarrow \log_{\frac{1}{(x-2)^2}}(2-x) \rightarrow \log(2-x)(2-x)^2 \rightarrow \log(2-x)^3 = 3$ $(2-x)^3 = 10^3 \rightarrow 2-x = 10 \rightarrow x = -8$ جایگذاری $\rightarrow \log_{\sqrt{4}} 8 = 6$	۶
$3^{x^2-2} = 3^{4x} \rightarrow x^2-2 = 4x \rightarrow x^2-4x-2=0 \rightarrow x = \frac{4+2\sqrt{6}}{2}$ ✓ $x = \frac{4-2\sqrt{6}}{2}$ منفی ✗ $\frac{4+2\sqrt{6}}{2} \rightarrow 2+\sqrt{6}$ جایگذاری $\rightarrow \log_6(2+\sqrt{6}-2) = \log_6 \sqrt{6} = \frac{1}{2}$	۷
$\frac{\log_3 8}{\log_3 18} \Rightarrow \frac{\log_3 2\times4}{\log_3 2\times9} \rightarrow \frac{\log_3 2 + \log_3 2 + \log_3 2}{\log_3 2 + \log_3 9} = \frac{\frac{15}{8}}{\frac{21}{8}} = \frac{15}{21} = \frac{5}{7}$	۸
$\frac{\log_4 6}{\log_4 12} = \frac{\log_4 3 + \log_4 2}{\log_4 3 + \log_4 4} = \frac{1.3}{1.8} = \frac{13}{18}$	۹
جایگذاری ۱- $\rightarrow a\log 2 + b\log 2 - a = 0 \rightarrow \log 2(a+b) = a \quad \log 2 = \frac{a}{a+b} \Rightarrow \frac{1}{\log 2} = \frac{a+b}{a}$ $1+\frac{b}{a} = \frac{1}{\log 2} \rightarrow \frac{b}{a} = \frac{1}{\log 2} - 1 \xrightarrow{\frac{1}{\log 2} = \log_2 10} \frac{b}{a} = \log_2 10 - 1 \rightarrow \log_2 2 \times \log_2 5 - 1$ $\frac{b}{a} = \log_2 5$ جایگذاری $\rightarrow (\sqrt{2})^{\log_2 5} \rightarrow 5^{\log_2 \sqrt{2}} = 5^{\frac{1}{2}} = \sqrt{5}$	۱۰

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۱

$3^{Ax+B} = x^2 \xrightarrow{\text{جایگذاری } x=1} 3^{A+B} = 1 \to A+B=0$

$\xrightarrow{x=3} 3^{3A+B} = 9 \quad 3A+B=2 \Rightarrow B=-1$

$x=0 \to 3^{B} \xrightarrow{B=-1} 3^{-1} = \frac{1}{3}$

۲

$2^{x+3} = 4^x + 15 \to 2^x \times 2^3 = 2^{2x} + 15$

$2^x = t \to 8t = 15 + t^2 \to t^2 - 8t + 15 = 0 \to t=5 ,\ t=3$

$2^x = 3 \to \log_2^3 = x \qquad 2^x = 5 \to \log_2^5 = x \qquad \{\log_2^3 , \log_2^5\}$

۳

$\log_{21}^{1323} = \log_{21}^{3} + 2 \qquad \log_{21}^{147} = \log_{21}^{7} + 1 \to \log_{21}^{\frac{21}{3}} \Rightarrow -\log_{21}^{3} + 2$

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

۴

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

$\log(x-1) = 1 \quad x-1 = 10 \quad x = 11 \ ✗$

$\log(1-x) = 1 \quad 1-x = 10 \quad x = -9 \ ✓$

$\log_3^{(-(-9))} = \log_3^{9} = 2$

۵

$\log_{\sqrt[3]{2}}^{x} \Rightarrow \log_{2^{1/3}}^{x} \to 3\log_2^{x} \to \log_2^{x^3}$

$\log_8^{(x^2+2x+4)(x-2)} \Rightarrow \log_2^{(x^3-2^3)} = 3 \Rightarrow x^3 - 2^3 = 2^3 \to x^3 = 16$

$\xrightarrow{\text{جایگذاری}} \log_2^{16} = 4$