۱- گزینه ۲

$y=x^2$ $y=2^{Ax+B}$ $(2,9),(1,1)$

$2^{2A+B}=9 \rightarrow 2^{A+B}=1 \rightarrow \begin{cases} A+B=0 \\ 2A+B=2 \end{cases} \rightarrow \begin{matrix} 2A=2 \\ A=1 \quad B=-1 \end{matrix}$

$2^{x-1} \xrightarrow{x=0} 2^{-1} \rightarrow \frac{1}{2}$ ✓

۲- گزینه ۲

$2^{x+2}=4^x+15 \rightarrow (2^x)^2-8(2^x)+15$

$\rightarrow +-3 \rightarrow 2^x=3 \rightarrow \log_2^3$

$\hookrightarrow +-5 \rightarrow 2^x=5 \rightarrow \log_2^5 \rightarrow \boxed{\log_3^{15}}$ ✓

۳- گزینه ۲

$(\log_{21}^3)^2+(1+\log_{21}^7)+2+\log_{21}^3$

$\downarrow$

$1-\log_{21}^3$

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

۴- گزینه ۲

$\log_{10}^{(1-x)^2(1-x)^3}=5 \rightarrow 10^5=(1-x)^5 \rightarrow x=-9$ ✓

$\log_2^9=2$ ✓

۵- گزینه ۲

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

$x^3=16 \rightarrow x=2^{\frac{4}{3}} \rightarrow \log_{2^{\frac{1}{3}}}^{2^{\frac{4}{3}}} \rightarrow 3\log_2^2=3$ ✓

$\log(2-x) - \log\frac{1}{(2-x)^2}$ (۲) -۶

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

$(2-x)=10 \rightarrow x=-8 \rightarrow \log_{\sqrt{2}}^{8} = \log_{2^{\frac{1}{2}}}^{2^3} = 6\log_2^2 = 6$ ✓

$3^{x^2-2} = 81^x = 3^{4x}$

$x^2-2=4x \xrightarrow{+6} x^2-4x+4 = 2+6 \rightarrow (x-2)^2 = 9$ (۲) -۷

$x-2=\sqrt{9} \rightarrow \log_9^{x-2} = \frac{1}{2}$ ✓

$\log_{18}^{8} = \frac{\log_3^8}{\log_3^{18}} = \frac{3\log_3^2}{\log_3^2 + 2\log_3^3} \rightarrow \frac{3\log_3^2}{\log_3^2 + 2} = \frac{3\times\frac{5}{8}}{\frac{5}{8}+2} = \frac{\frac{15}{8}}{\frac{21}{8}} = \frac{15}{21}$ (۲) -۸

$= \frac{5}{7}$ ✓

$\log_2^3 = 0,8 \rightarrow \frac{1}{2}\log_2^3 = 0,8 \Rightarrow \log_2^3 = 1,6$ (۲) -۹

$\log_{12}^{6} = \frac{\log_2^6}{\log_2^{12}} = \frac{\log_2^{2\times3}}{\log_2^{2^2\times3}} = \frac{\log_2^3 + \log_2^2}{\log_2^3 + \log_2^4} = \frac{1,6+1}{1,6+2} = \frac{2,6}{3,6}$

$\frac{26}{36} = \frac{13}{18}$ ✓

$a\log^{r} - a + b\log^{r} = \log^{r}_{(a+b)} - a = 0 \Rightarrow \log^{r} = \frac{a}{a+b}$ (r) $- b$

$\log^{10}_{r} = \frac{a+b}{a} \rightarrow \log\frac{10}{r} - 1 = \log^{10}_{r} - \log^{r}_{r}$

$\log^{a}_{r} = \frac{b}{a}$ $\quad (r)^{\frac{1}{r}\times\frac{b}{a}} = r^{\log^{\sqrt{a}}_{r}} \rightarrow \sqrt{a}$ ✓