(1)

$x_1=1 \xrightarrow{f} y_1=1$

$x_2=3 \xrightarrow{f} y_2=9$

$f(1)=1 \longrightarrow 3^{A+B}=3^0 \rightarrow A+B=0$

$f(3)=9 \longrightarrow 3^{3A+B}=3^2 \rightarrow 3A+B=2$

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

گزینه «۲» با حواس‌ها

(2)

$\log_3^{4^x+15}=x+3$

$4^x+15=3^{x+3}$

$4^x+15=3^x\cdot 27$

$a^2-18a+15=0$

$(a-3)(a-5)=0$

$a=3 \Rightarrow 3^x=3 \Rightarrow x_1=\log_3^3$

$a=5 \Rightarrow 3^x=5 \Rightarrow x_2=\log_3^5$

$\rightarrow x_1+x_2=\log_3^{15}$

(3)

$(\log_{\frac{1}{3}}^{3})^2+\log_{\frac{1}{3}}^{147}\log_{\frac{1}{3}}^{1323}$

$(\log_{\frac{1}{3}}^{3})^2+(\log_{\frac{1}{3}}^{147}-\log_{\frac{1}{3}}^{3})(\log_{\frac{1}{3}}^{147}+\log_{\frac{1}{3}}^{3})=(\log_{\frac{1}{3}}^{147})^2$

گزینه «۴»

(4)

$\log^{x^2-2x+1}+3\log^{1-x}=5$

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

$x=-9 \rightarrow \log_c^9=2$ گزینه «۲»

(5)

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

$\log_2^{x^3-8}=3 \Rightarrow x^3-8=8 \Rightarrow x^3=16 \Rightarrow x=2^{\frac{4}{3}}$

$\rightarrow \log_{2^{\frac{1}{2}}}^{2^{\frac{4}{3}}}=$ گزینه «۴»

(6)

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

$\rightarrow \log^{-(x-2)^2} = 3 \rightarrow x-2 = -10 \Rightarrow x = -8 \rightarrow \log_{\frac{1}{2}}^{8} = \boxed{6}$

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(7)

$2^{x^2-2} = 2^{4x} \rightarrow x^2 - 4x - 2 = 0 \rightarrow (x-2)^2 - 6 = 0$

$\rightarrow x-2 = \pm\sqrt{6} \rightarrow \log_{6}^{x-2} \xrightarrow{x-2>0} \log_{6}^{\sqrt{6}} = \boxed{\frac{1}{2}}$

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(8)

$\log_{2}^{3} = \frac{5}{8} \rightarrow \log_{3}^{2} = \frac{8}{5}$

$\log_{12}^{8} = \frac{\log_{2}^{8}}{\log_{2}^{12}} = \frac{3}{1+\frac{\log_{2}^{3}}{\log_{2}^{4}}} = \frac{3}{1+\frac{5}{12}} = \frac{3}{\frac{17}{12}} = \boxed{\frac{5}{7}}$

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(9)

$\log_{4}^{3} = 0/8 \rightarrow \log_{2}^{3} = 1,6$

$\log_{12}^{6} = \frac{\log_{2}^{6}}{\log_{2}^{12}} = \frac{1+1,6}{2+1,6} = \frac{2,6}{3,6} = \boxed{\frac{13}{18}}$

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(10)

$(a.\log_2|x^2 + ax + b\log_2 = 0 \xrightarrow{x=-1}$

$\rightarrow a\log^2 - a + b\log_2 = 0 \rightarrow \log^2 = 1 + \frac{b}{a}\log^2 = 1 - \log^2 \log^{25}$

$\rightarrow \frac{b}{a} = \frac{\log^5}{\log^2} = \log_2^5 \rightarrow (\sqrt{2})^{\log_2^5} = 5^{\log_2^{\sqrt{5}}} = \boxed{\sqrt{5}}$