نام و نام خانوادگی : علی ربانی   ۲۰   پاسخ تکلیف شماره ۲۴   کلاس یازدهم ۸

۱- (۲)

$y = x^2 \qquad f(x) = 3^{Ax+B} \qquad f(x) = 3^{x-1} \qquad 3^{0-1} = \boxed{\frac{1}{3}}$ ✓ $\qquad \frac{1}{3}$

$y = 1^2 \Rightarrow (1,1) \qquad 3^{A+B} = 1 \Rightarrow A+B=0 \qquad 2A = 2 \qquad (0, \frac{1}{3})$

$y = 3^2 \Rightarrow (3,9) \qquad 3^{3A+B} = 9 \Rightarrow 3A+B = 2 \qquad A = 1 \Rightarrow B = -1$

۲- (۲)

$\log_2^{(4^x+15)} = x+3$

$2^{x+3} = 4^x + 15 \Rightarrow 2^x \times 2^3 = 2^{2x} + 15 \Rightarrow 2^{2x} + 15 - 2^x \times 2^3 \xrightarrow{2^x = t} t^2 + 15 - 8t = t^2 - 8t + 15 \to (t-3)(t-5)$

$\begin{cases} t = 5 \Rightarrow 2^x = 5 \to \log_2^5 = x \\ t = 3 \Rightarrow 2^x = 3 \to \log_2^3 = x \end{cases} \to \log_2^5 + \log_2^3 = \boxed{\log_2^{15}}$ ✓

۳- (۲)

$(\log_{21}^3)^2 + \log_{21}^{(147)} \log_{21}^{(63)} = (\log_{21}^3)^2 + (\log_{21}^9 + \log_{21}^{21} + \log_{21}^7)(\log_{21}^{21} + \log_{21}^7)$

$(\log_{21}^3)^2 + (\log_{21}^9 + \log_{21}^7 + 1)(\log_{21}^7 + 1) \xrightarrow[\log_{21}^7 = z]{\log_{21}^3 = t} t^2 + (2t + z + 1)(z+1)$

$t^2 + 2tz + 2t + z^2 + z + z + 1 = \underline{t^2 + z^2 + 2tz} + 2z + 1 + 2t$

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

$1 + 2 + 1 = \boxed{4}$ ✓

۴- (۲)

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

$\log(x-1)^2 + 2\log(1-x) - 5 = 0 \Rightarrow \log(1-x)^2 + 2\log(1-x) - 5 = 0$

$2\log(1-x) + 3\log(1-x) - 5 = 0$

$5\log(1-x) - 5 = 0 \qquad \log^{1-x} = 1$

$\log_3^{-x} = \log_3^9 = \boxed{2}$ ✓ $\qquad \Rightarrow x = -9$ ✓

۵- (۲)

$\log_2^{(x^2+2x+4)} + \log_2^{(x-2)} = 2 \Rightarrow \log_2^{(x-2)(x^2+2x+4)} = 2 \Rightarrow \log_2^{x^3-8} = 3 \Rightarrow x^3 - 8 = 8$

$x^3 = 16 \qquad x = \sqrt[3]{16}$ ✓

$\log_{\sqrt[3]{2}}^x = \log_{\sqrt[3]{2}}^{\sqrt[3]{16}} = \boxed{4}$ ✓

۶- (۲)

$\log(x-2) - \log\frac{1}{(x-2)^2} = 3 \quad (x-2)^3 = 1000$

$x-2 = 10 \quad x = -8$ ✓

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

$\log_{\sqrt{2}}^{8} = 2\log_2^8 = 6$ ✓

۷- (۲)

$2^{x^2-2} = 8^3 = 2^{12}$

$x^2 - 2 = 12 \quad x^2 - 12 - 2 = 0$

$(x-4)^2 = 36$

$\log_y^{(x-2)^2} = 1$

$= 2\log_y^{x-2} = 1$

$\log_y^{x-2} = \frac{1}{2}$ ✓

$\frac{1}{2}$

۸- (۲)

$\log_2^{25} = \frac{\log_2^{25}}{\log_2^4} = \frac{1}{\log_{25}^2} = \frac{5}{8} \Rightarrow \log_2^5 = \frac{8}{5}$

$\log_{18}^8 = \frac{\log_2^8}{\log_2^{18}} = \frac{3}{1+\log_2^9} = \frac{3}{1+2\log_2^3} = \frac{3}{1+\frac{16}{5}} = \frac{3}{\frac{21}{5}} = \frac{5}{7}$ ✓

۹- (۲)

$\log_3^4 = 0.8$

$\log_{12}^4 = \frac{\log_3^4}{\log_3^{12}} = \frac{\log_3^4 + \log_3^3}{\log_3^4 + \log_3^3} = \frac{0.8+1}{1+0.8} = \frac{1.8}{1.8} = \frac{18}{18}$ ✓

۱۰- (۲)

$(a\log 2)x^2 + ax + b\log 2 = 0 \xrightarrow{x=-1} a\log 2 - a + b\log 2 = 0$

$a\log 2 + b\log 2 = a$

$\log 2(a+b) = a$

$\log_{10}^{2^{a+b}} = 0 \Rightarrow \frac{2^{a+b}}{10^a} = 1$

$\log 2^{a+b} - \log 10^a = 0$

$\log 2^{(a+b)} - x = 0 \Rightarrow \log 2^{(a+b)} - \log 10^a = 0$

$x = \frac{\log 2^{(a+b)}}{\log 10^{(a)}} = 0$

$\frac{2^a \times 2^b}{2^{2a} + 5^a} = 1 \quad 2^b = 5^a \quad \log_5^{2^b} = a \Rightarrow b\log_5^2 = a$

$(\sqrt{2})^{\frac{b}{a}} = \sqrt{2} \quad \frac{b}{b\log_5^5} = \sqrt{2}^{\log_2^5} = 5^{\frac{1}{2}\log_2^{\sqrt{5}}} \Rightarrow \sqrt{5}$ ✓