(1)

$f(x)=3^{Ax+B} \xrightarrow{x=3} 3^2=3^{3A+B}$ $3A+B=2$ $\to A=1$

$y=x^2 \xrightarrow{x=1} 1^2=3^{A+B}$ $A+B=0$ $A=1$

۲

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

(2)

$\log_2(4^x+15)=x+3 \to 4^x+15=2^{x+3} \Rightarrow 2^{2x}-2^{x+3}+15=0$

$4^x+15>0$

~~$2^x>-15$~~

$t^2-8t+15=0$ ۲ $2^x=t$

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

$t=3$, $t=5$

$2^x=3 \to x=\log_2 3$

$2^x=5 \to x=\log_2 5$ $\Bigg\} \to x_1+x_2=\log_2 15$

(3)

$(\log_{21}3)^2+\log_{21}(21\times7)\,\log_{21}(21^2\times3) \to (\log_{21}3)^2+(\log_{21}21+\log_{21}7)(\log_{21}21^2+\log_{21}3)$

$= (1+1-\log_{21}3)(2+\log_{21}3)+(\log_{21}3)^2=4$ ۲

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(4)

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

$-(x-1)^2(x-1)^3=10^0 \rightarrow -(x-1)^5=10^0 \rightarrow x-1=-1$

$x=0$

$\log_{\mu}^{-x}=\log_{\mu}^{1}=2$

(5)

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

$(x^3-1)=1$

$x^3=2 \rightarrow x=2^{4/3}$

$\log_{2^{\frac{1}{3}}}^{2^{\frac{4}{3}}}=4$

(6)

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

$-(x-2)^3=1^3$

$\log_{\sqrt{2}}^{-x}=\log_{\sqrt{2}}^{1}=\frac{3}{\frac{1}{2}}=6$

$x-2=-1$

$x=-1$

(7)

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

$x^2-4x-2=0 \rightarrow \frac{4\pm\sqrt{16+8}}{2}=2\pm\sqrt{2}$

$\log_{2}^{2+\sqrt{2}-2}=\frac{1}{2}$

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(8)

$\log_{۴}^{۲} = \frac{۵}{۸} \rightarrow \frac{۳\log_{۴}^{۲}}{۲\log_{۴}^{۳} + \log_{۴}^{۲}} = \frac{\log_{۴}^{۸}}{\log_{۴}^{۱۸}} = \log_{۱۸}^{۸} = \frac{۱۵}{۲۱} = \frac{۵}{۷}$

(9)

$\log_{۴}^{۳} = ۰/۸$

$\log_{۱۲}^{۲} = \rightarrow \frac{\log_{۴}^{۳} + \log_{۴}^{۲}}{\log_{۴}^{۳} + \log_{۴}^{۴}} = \frac{۰/۸ + \frac{۱}{۴}}{۰/۸ + ۱} = \frac{۱۳}{۱۸}$

(10)

$(a\log ۲)x^{۲} + ax + b\log ۲ = ۰ \xrightarrow{x=-۱}$

$a\log ۲ - a + b\log ۲ = ۰ \rightarrow (\log_{۱۰}^{۲})(a+b) = a$

$\rightarrow \log_{۲}^{۱۰} = \frac{a+b}{a} = ۱ + \frac{b}{a}$

$\frac{b}{a} = \log_{۲}^{۱۰} - ۱ = \log_{۲}^{۵}$

$\sqrt{۲}^{\log_{۲}^{۵}} = a^{\frac{۱}{۲}\log_{۲}^{۲}} = \sqrt{a}$