Subject: Date: / /

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

$y=x^2$ $\xrightarrow{x=1}$ $1^2=a^{A+B}$ $\Rightarrow A+B=0$ $\rightarrow A=1$

$A=1$

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

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

$2^x=t$

$t^2-4t+15=0$

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

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

$2^x=5 \rightarrow x=\log_2^5$

$\rightarrow x_1+x_2=\log_2^{15}$

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

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

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Subject: Date: / /

(4)

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

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

$x=0$

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

(5)

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

$(x^3-1)=1$

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

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

(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)

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

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

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

YASHA

Subject: Date: / /

(8)

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

$\frac{۱۵}{۸}$, $\frac{۵}{۸}$

(9)

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

(10)

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

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

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

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

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