Date .... Subject .... مهدی کاظمی گروه پسر B

1

$f(x)=3^{Ax+B}$ $\qquad y=x^2$

$f(1)=3^{A+B}=x^2=1 \longrightarrow A+B=1 \longrightarrow B=-A$

$f(2)=3^{3A+B}=3^2 \longrightarrow 3A+B=2 \longrightarrow 3A-A=2 \longrightarrow A=1$

$f(x)=3^{x-1} \longrightarrow f(0)=3^{-1}=\frac{1}{3}$ $\qquad y=\frac{1}{3}$ $\qquad B=-1$

2

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

$2^{x+3}=4^x+15 \longrightarrow 2^{x+3}=2^{2x}+15 \qquad \underline{2^x=t}$

$2^3\times 2^x=(2^x)^2+15 \longrightarrow 8\times t=t^2+15 \longrightarrow t^2-8t+15=0$

$(t-3)(t-5)=0 \longrightarrow t=3,5 \longrightarrow 2^x=3 \longrightarrow x=\log_2^3$

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

$x_1+x_2=\log_2^3+\log_2^5=\log_2^{15}$

3

$(\log_{21}^3)^2+\log_{21}^{147}\log_{21}^{1323}=?$ $\qquad \log_{21}^3=a \quad \log_{21}^7=b$

$\log_{21}^{21}=\boxed{1=a+b}$

$\log_{21}^{147}=\log_{21}^3+2\log_{21}^7=a+2b$

$\log_{21}^{1323}=3\log_{21}^3+2\log_{21}^7=3a+2b$

$a^2+(a+2b)(3a+2b)=4(\underline{a^2+2ab+b^2})$

$4(a+b)^2=4$

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

$$\underbrace{\log^{(x^2-2x+1)}} \downarrow \log^{(x-1)^2} \longrightarrow 2\log^{x-1} + 3\log^{1-x} = 5$$

$x-1>0 \to x>1$ $\qquad 5\log_{10}^{1-x} = 5$

$1-x>0 \to 1>x$

$$\log_{10}^{1-x} = 1 \longrightarrow 1-x=10$$

$x=-9$

$$\log_3^{9\;3^2} = 2\log_3^3 = 2$$

5

$$\log_2^{(x^2+2x+4)} + \log_2^{(x-2)} = 3 \qquad \log_{\sqrt{2}}^{x} = ?$$

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

$$\log_2^{x^3-8} = 3 \longrightarrow 2^3 = x^3-8 \longrightarrow x=\sqrt[3]{16} \qquad \log_{\sqrt{2}}^{\sqrt[3]{16}} = \log_{2^{\frac{1}{2}}}^{2^{\frac{4}{3}}}$$

$$\longrightarrow \frac{\frac{4}{3}}{\frac{1}{2}}\log_2^2 = 4\log_2^2 = 4$$

6

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

$x-2=t$

$$\log^{-t} - \log^{\frac{1}{t^2}} = 3 \longrightarrow \log^{-t^3} = 3$$

$$10^3 = -t^3 \longrightarrow \boxed{t=-10}$$

$x-2=-10$

$x=-8$

$$\log_{\sqrt{2}}^{8} = \frac{3}{\frac{1}{2}}\log_2^2 = 6$$

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$3^{x^2-2} = 81^x \qquad 3^{x^2-2} = 3^{4x} \qquad x^2-4x-2=0$

$\Delta = 16+8=24 \qquad \dfrac{+4 \pm \sqrt{24}}{2} = 2+\sqrt{6}$

$\log_6^{(x-2)} = \log_6^{(2+\sqrt{6}-2)} = \log_6^{\sqrt{6}} = \frac{1}{2}\log_6^6 = \frac{1}{2}$

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$\log_3^2 = \frac{5}{8} \qquad \log_{18}^8 = ?$

$3^{\frac{5}{8}} = 2 \longrightarrow 3 = 2^{\frac{8}{5}} \qquad \log_{2\times3^2}^{2^3} = \log_{2\times2^{\frac{16}{5}}}^{2^3} =$

$\log_{2^{\frac{21}{5}}}^{2^3} = \frac{3}{\frac{21}{5}}\log_2^2 = \frac{15}{21} = \frac{5}{7}$

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$\log_4^3 = 0/8 \qquad \log_{12}^6 = ?$

$4^{0/8} = 3 \longrightarrow 2^{1/6} = 3 \qquad \log_{4\times3}^{2\times3} = \log_{4\times2^{1/6}}^{2\times2^{1/6}} =$

$\log_{2^{\frac{36}{10}}}^{2^{\frac{26}{10}}} = \frac{\frac{26}{10}}{\frac{36}{10}}\log_2^2 = \frac{26}{36} = \frac{13}{18}$

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$(a\log^2)x^2 + ax + b\log^2 = 0$

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

$a+b = \frac{a}{\log 2} \qquad b = \frac{a}{\log^2} - a \qquad \frac{b}{a} = \frac{1}{\log^2} - 1$

$(\sqrt{2})^{\frac{b}{a}} = (2^{\frac{1}{2}})^{\frac{1}{2}(\frac{1}{\log 2}-1)} \qquad \frac{1}{\log^2} = \log_2^{10}$

$\sqrt{5}$