اسم محمد ... ۲۴ پایه ... B

۲۰

$x=1 \to f(x)=1 \Rightarrow 3^{A+B}=1 \Rightarrow A+B=0$ ۱ ۲

$x=3 \to f(x)=9 \Rightarrow 3^{3A+B}=9 \Rightarrow 3A+B=2$

$\Rightarrow 2A=2 \Rightarrow A=1 \Rightarrow B=-1$

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

۲ ۲

$$2^{\log_2(4^x+15)} = 2^{x+3}$$

$\Rightarrow 4^x+15 = 8\times 2^x$

$\Rightarrow 2^{2x} - 8\times 2^x + 15 \Rightarrow t=2^x \Rightarrow t^2-8t+15=0$

$\Rightarrow t=\frac{8\pm 2}{2} = 5, 3 \Rightarrow 2^x = 5, 3 \Rightarrow \boxed{x=\log_2 5, \log_2 3 \quad \alpha+\beta=\log_2 15}$ ✓

$a=(\log_{21}3)^2+\log_{21}147\,\log_{21}1323=(\log_{21}3)^2+\log_{21}147\times\log_{21}(9\times147)$ ۳ ۲

$=(\log_{21}3)^2+\log_{21}(7\times21)\,\log_{21}(9\times7\times21)=(\log_{21}3)^2+(\log_{21}7+1)(2+\log_{21}3)$

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

$=4$ ✓

۴ ۲

$10^5=(x^2-2x+1)(1-x)^3$

$\Rightarrow (x-1)^2\times(1-x)^3=(1-x)^5=10^5 \Rightarrow 1-x=10$

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

۵ ۲

$a=\log_2(x^2+2x+4)+\log_2(x-2)=3$

$2^a=8=(x^2+2x+4)(x-2)=x^3-8=8$

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

(6)

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

$$= \log(2-x)^3 = 3 \xRightarrow{a} 10^3 = 1000 = (2-x)^3 \Rightarrow 10 = 2-x$$

$$\Rightarrow x = -8 \Rightarrow \log_{\sqrt{2}} 8 = 6$$

(2)

(7)

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

$$\Rightarrow x^2 - 4x - 2 = 0 \Rightarrow x = \frac{4 \pm 2\sqrt{6}}{2}$$

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

(2)

(8)

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

$$= \frac{3}{\frac{21}{5}} = \frac{5}{7}$$

(2)

(9)

$$\frac{\log_4 6}{\log_4 12} = \frac{\log_4 2 + \log_4 3}{1+\log_4 3} = \frac{\frac{1}{2}+\log_4 3}{1+\log_4 3} =$$

$$\frac{\frac{1}{2}+0.8}{1+0.8} = \frac{13}{18}$$

(2)

۱۵

۳

$$\frac{-a}{a \log ۲} = -\log_{۲} ۱۰ = \log_{۲} \frac{1}{۱۰}$$

$$\frac{\log_{۲} \frac{1}{۱۰}}{\alpha \circ \beta} - \frac{(-1)}{\alpha} = \beta = \log_{۲} \frac{1}{۵}$$

$$\frac{b \log ۲}{a \log ۲} = -\log_{۲} \frac{1}{۵}$$

$$\left(\left(\sqrt{۲}\right)^{-\log_{۲} \frac{1}{۵}}\right) = ۲۵^{\log_{۲} \sqrt{۲}} = \sqrt{۵}$$