۱۸,۲۵

ورنیا علیانی

① $y=x^2$: $x=1 \to y=1$; $x=2 \to y=4$

$f(x)=3^{Ax+B}$ ⟵ $1=3^{A+B}$, $4=3^{2A+B}$

$\begin{cases} A+B=0 \\ 2A+B=2 \end{cases} \Rightarrow A=1 \quad B=-1$

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

② $\log_2^{(4^x+10)} = x+3$

$2^{2x}+10 = 2^{x+3} = 2^x \times 8$ ✓

$2^{2x}+10=8\times 2^x \quad t=2^x \longrightarrow t^2-8t+10=0 \quad (t-2)(t-5)=0 \begin{cases} t=2 \\ t=5 \end{cases}$

$2^x=2 \Rightarrow x=\log_2^2 \qquad 2^x=5 \Rightarrow x=\log_2^5$

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

③ $(\log_{21}^3)^2 + \log_{21}^{147} \times \log_{21}^{343}$

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

$\log_{21}^3 + \log_{21}^7 = 1 \Rightarrow \log_{21}^3 = t \longrightarrow \log_{21}^7 = 1-t$

$\log_{21}^{147} = t + 2(1-t) = 2-t$

$\log_{21}^{343} = \log_{21}^{3^3\times 7^1} = 3t + 2(1-t) = t+2$

$\Rightarrow t^2 + (2-t)(t+2) = t^2 + 4 - t^2 = 4$

Arman

page: ( )

Subject:
Year: Month: Day:

۴) $\log(x-1)^2 + 3\log(1-x) = 5 \quad 2\log(1-x) + 3\log(1-x) = 5$

$\Rightarrow \log_{10}(1-x) = 1 \Rightarrow 1-x = 10 \quad x = -9 \quad \log_3 9 = 2$

(۱)

۵) (۰٫۵)

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

$(x^3-8) = 8 \rightarrow x = \sqrt[3]{16}$

$(x-2)(x^2+2x+4) = 8 \longrightarrow (x-2)^3 = 8 \Rightarrow x-2 = 2 \Rightarrow x = 4$

$\log_{\sqrt[3]{2}} 4 = 3\log_2 4 = 3 \times 2 = 6$

$\log_{\sqrt[3]{2}} x = 4$

۶) (۱٫۷۵)

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

$\log(2-x) + 2\log(2-x) = 3\log(2-x) = 3 \Rightarrow \log_{10}(2-x) = 1$

$2-x = 10 \quad x = -8 \qquad \log_{\sqrt{2}} 8 = \frac{3}{2}\log_2 2 = \frac{3}{2} \quad 6$

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

۷) $3^{x^2-2} = 81^x \longrightarrow 3^{x^2-2} = 3^{4x}$

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

(۱)

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

۸) $\log_{18} 8 = 3\log_{18} 2 \xrightarrow{\text{تغییر مبنا}} \log_{18} 2 = \frac{\log_3 2}{\log_3 18} = \frac{a}{\log_3 9 + \log_3 2}$

$= \frac{a}{2+a} \longrightarrow 3\log_{18} 2 = 3\left(\frac{a}{2+a}\right) = \frac{5}{7}$

(۱)

Arman

r: Mounth: Date: Subject : (.....)

(9)

$$\log_{12} 6 = \frac{\log_4 6}{\log_4 12} = \frac{\log_4 2 + \log_4 3}{\log_4 3 + \log_4 4} = \frac{\frac{1}{2} + \frac{4}{5}}{\frac{4}{5} + 1} = \frac{13}{18}$$

(16)

$x=-1 \longrightarrow a\log 2 - a_0 b\log 2 = 0$

$a(\log 2 - 1) + b\log 2 = 0$

(5)

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

$\longrightarrow 2 = 10^{\log 2} \Rightarrow 2^{\frac{1}{2\log 2}} = (10^{\log 2})^{\frac{1}{2\log 2}} = 10^{\frac{1}{2}} = \sqrt{10}$

$2^{\frac{1}{2\log 2} - \frac{1}{2}} = \frac{\sqrt{10}}{\sqrt{2}} = \sqrt{5}$

Arman