Viana subject : Year : Month : Date :

عرفان حقیقی یازدهم سیر A

$$y = x^2 \begin{cases} x=1 & y=1 \\ x=3 & y=9 \end{cases} \qquad 3^{A+B} = 1, \quad 3^{3A+B} = 9$$ ۱/

$$\begin{cases} A + B = 0 \\ 3A + B = 2 \end{cases} \Rightarrow A = 1 \quad B = -1$$

$$x = 0 \Rightarrow 3^{-1} = \frac{1}{3}$$

۲/

$$2^{x+3} = 4^x + 15 \Rightarrow 2^x \times 8 = 2^{2x} + 15 \Rightarrow 2^x = t$$

$$t^2 - 8t + 15 = 0 \Rightarrow t = 5 \text{ و } t = 3$$

$$\log_2 5 - \log_2 3$$

۳/

$$(\log_{21} 3)^2 + \log_{21} 147 \, \log_{21} 1323 = ? \Rightarrow (\log_{21} 3)^2 + \left[(\log_{21} 7 + \log_{21} 21)\right.$$

$$\left.(\log_{21} 3 + \log_{21} 21^2)\right] \Rightarrow (\log_{21} 3)^2 + (\log_{21} 7 + 1)(\log_{21} 3 + 2)$$

$$\Rightarrow (\log_{21} 3)^2 + \log_{21} 7 \, \log_{21} 3 + 3 + \log_{21} 7 \Rightarrow \log_{21} 3 (\log_{21} 3 + \log_{21} 7) + 3 + \log_{21} 7$$

$$\Rightarrow \log_{21} 3 + 3 + \log_{21} 7 = 4$$

4)

$$\log_{10}(x-1)^2 + \log_{10}(1-x)^3 = 5$$

$$(x-1)^2 = (1-x)^2 \Rightarrow \log_{10}(1-x)^5 = 5$$

$$10^5 = (1-x)^5 \Rightarrow \boxed{x = -9}$$

5)

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

$$x^3-8 = 8 \Rightarrow x^3 = 16 \Rightarrow x = \sqrt[3]{16}$$

$$\log_{\sqrt[3]{2}} \sqrt[3]{16} \Rightarrow \log_2 16 = 4$$

6)

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

$$\Rightarrow \frac{(2-x)}{\frac{1}{(2-x)^2}} \Rightarrow (2-x)^3 = 10^3 \Rightarrow \boxed{x = -8}$$

$$\log_{\sqrt{2}} 8 \Rightarrow 6\log_2 2 \Rightarrow 6$$

(۷)

$۳^{x^۲-۲} = ۸۱^{x} \Rightarrow ۳^{x^۲-۲} = ۳^{۴x} \Rightarrow x^۲ - ۴x - ۲ = ۰$

$x = ۲ \pm \sqrt{۶} \Rightarrow x = ۲ + \sqrt{۶} \Rightarrow \log_{۶}^{\sqrt{۶}} = \frac{۱}{۲}$

(۸)

$\log_{۱۸}^{۸} \Rightarrow \frac{\log_{۳}^{۸}}{\log_{۳}^{۱۸}} \Rightarrow \frac{۳\log_{۳}^{۲}}{\log_{۳}^{۹} + \log_{۳}^{۲}} \Rightarrow \frac{۳(\frac{۵}{۸})}{۲ + \frac{۵}{۸}}$

$\Rightarrow \log_{۱۸}^{۸} = \frac{۱۵}{۲۱}$

(۹)

$\log_{۱۲}^{۶} = \frac{\log_{۴}^{۶}}{\log_{۴}^{۱۲}} \Rightarrow \frac{\log_{۴}^{۲} + \log_{۴}^{۳}}{\log_{۴}^{۳} + \log_{۴}^{۴}} \Rightarrow \frac{\frac{۱}{۲} + \frac{۸}{۱۰}}{\frac{۸}{۱۰} + ۱}$

$\Rightarrow \log_{۱۲}^{۶} = \frac{۱۳}{۱۸}$

(۱۰)

$a\log۲ - a + b\log۲ = ۰ \Rightarrow (a+b)\log۲ - a = ۰$

$(a+b)\log۲ = a \Rightarrow a + b = \frac{a}{\log۲} \Rightarrow b = a\left(\frac{۱}{\log۲} - ۱\right)$

$\frac{b}{a} = \frac{۱}{\log۲} - ۱ \Rightarrow (\sqrt{۲})^{\frac{۱}{\log۲} - ۱} \Rightarrow ۲^{\frac{۱}{۲}\left(\frac{۱}{\log۲} - ۱\right)} \Rightarrow$

$۲^{\frac{\log_{۲}^{۱۰} - ۱}{۲}} \Rightarrow ۲^{\frac{\log_{۲}^{۵}}{۲}} \Rightarrow ۵^{\frac{۱}{۲}} \Rightarrow \sqrt{۵}$