مهتاب قدیری

۱۳٫۵

۱۱ شنبه
بهمن ۱۳۹۹
۱۶ جمادی الثانی ۱۴۴۲
2021 January 30

۱- $x=1 \to (1)^2 = 1 \Rightarrow 1 = 3^{A+B}$
$x=3 \to (3)^2 = 9 \Rightarrow 9 = 3^{3A+B}$
$\begin{cases} 3A+B=2 \\ A+B=0 \end{cases}$
$A=+1 , B=-1$ ۱

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

۲- $: x+3 = \log_2^{(4^x+15)}$
$4^x + 15 > 0 \Rightarrow x \in \mathbb{R}$

$2^{x+3} = 4^x + 15 \Rightarrow 2^{x+3} - 2^{2x} = 15 \xRightarrow{2^x = t} 8t - t^2 - 15 = 0$
$t^2 - 8t + 15 = 0$ ۲

$\Rightarrow t=3 , t=5 \Rightarrow 2^x = 3 , 5 \xRightarrow[\text{ریشه‌ها}]{\text{مجموع}} \log_2^3 + \log_2^5 = \boxed{\log_2^{15}}$

۳- $(\log_{21}^3)^2 + \left((\log_{21}^3 + \log_{21}^{49}) \times (\log_{21}^{27} + \log_{21}^{49})\right) = 4\log_{21}^7 + 4\log_{21}^{14} + 8\log_{21}^{10}$

$2\log_{21}^7 \quad 3\log_{21}^3 \quad 2\log_{21}^7$

$\log_{21}^9 \quad 3(\log_{21}^3)^2 + 2\log_{21}^3 \log_{21}^7 + 6\log_{21}^7 \log_{21}^3 + 4(\log_{21}^7)^2$ ۰٫۵

$3\log_{21}^9 \quad \log_{21}^3 \log_{21}^7 (2+6) \quad 4\log_{21}^{14}$

$\Rightarrow \boxed{4(\log_{21}^{8400})}$

۴- $\log(x^2-2x+1) = 2\log(1-x)$

$2\log(1-x) + 3\log(1-x) = 5 \Rightarrow \log(1-x) = 1 \Rightarrow 1-x = 10$ ۱
$\boxed{x=-9}$

$\log_3^{(-x)} = \log_3^9 = 2$

۵- $\log_2^{(x+2)^2} + \log_2^{(x-2)} = 3$ ۰

$2\log_2^{x+2} + \log_2^{x-2} = 3 \Rightarrow$

$(x-2)(x^2+2x+4) = (x^3-8) = 8 \to x = \sqrt[3]{16}$

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

۶- $\log(2-x) - \log[(2-x)]^2 = 3 \Rightarrow 3\log(2-x) = 3 \Rightarrow \log(2-x) = 1 \Rightarrow 2-x = 10$
$\boxed{x=-8}$

$\log_{\sqrt{2}}^{-(-8)} = 6$ ۱

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

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۷- $3^{x^2-2} = 3^{4x} \Rightarrow x^2-2=4x \Rightarrow x^2-4x-2=0$

$\Rightarrow x = \frac{4 \pm \sqrt{24}}{2} = 2 \pm \sqrt{6} \xRightarrow{(x>2)} 2+\sqrt{6}$ ✓ (2)

$\log_{6}^{x-2} = \log_{6}^{\sqrt{6}} = \frac{1}{2}$

۸- $\log_{18}^{8} = 3\log_{\underset{3^2\times 2}{18}}^{2} = \frac{3}{\log_{2}^{18}} = \frac{3}{2\log_{2}^{3}+1} = \frac{3}{\frac{16}{5}+1} = \frac{5}{7}$ $: \log_{4}^{3} = \frac{5}{8}$ (2)

۹- $\log_{12}^{6} = \log_{12}^{2} + \log_{12}^{3} = \frac{1}{\log_{2}^{12}} + \frac{1}{\log_{3}^{12}} = \frac{1}{2+\log_{2}^{3}} + \frac{1}{\log_{3}^{4}+1}$ $: \log_{4}^{3} = \frac{4}{5}$

$\frac{1}{2+\frac{8}{5}} + \frac{1}{\frac{5}{4}+1} = \frac{1}{\frac{18}{5}} + \frac{1}{\frac{9}{5}} = \frac{15}{18}$ ~~0.5~~ $\log_{3}^{4} = \frac{5}{4}$

$2\log_{3}^{2} = \frac{5}{4}$

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

$\xRightarrow{\div a} \log 2\left(1+\frac{b}{a}\right) = 1 \Rightarrow \log 2^{\left(1+\frac{b}{a}\right)} = 1 \Rightarrow 2^{\left(1+\frac{b}{a}\right)} = 10 \Rightarrow$

$2 \times 2^{\frac{b}{a}} = 10 \Rightarrow 2^{\frac{b}{a}} = 5 \Rightarrow \log_{2}^{5} = \frac{b}{a}$ 1.5

$\sqrt{2}^{\frac{b}{a}} = \sqrt{2}^{\log_{2}^{5}} = 2^{\log_{4}^{5}} = 2\log_{1}^{5}$

$\hookrightarrow \left(2^{\log_{2}^{5}}\right)^{\frac{1}{2}} = \sqrt{5}$

۳) $(\log_{21}^{3})^2 + \log_{21}^{7\times 21}\log_{21}^{63\times 21} = (\log_{21}^{3})^2 + (\log_{21}^{7}+\log_{21}^{21})(\log_{21}^{63}+\log_{21}^{21})$

$= (\log_{21}^{3})^2 + \left(\log_{21}^{\frac{21}{3}}+1\right)\left(1+\log_{21}^{21\times 3}\right)$

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

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