

$f(x) = 3^{Ax+13} (1, 1) \rightarrow 3^{A+13} \cdot 1 - A+B=0$   
 $(3, 3^2) \rightarrow 3^{3A+13} \cdot 3^2 - 3A+B=2$

$\left. \begin{matrix} A=1 \\ B=-1 \end{matrix} \right\}$

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

$2^{x+3} = 2^{2x} + 15 \rightarrow 2^{(x+3)} \cdot 2^{2x} = 15 \cdot 2^{2x} \rightarrow 2^3 \cdot 2^x = 15$

$2^x \cdot 2 = 2(8-2) = 15 \rightarrow 2^2 - 8x + 15 = 0 \rightarrow x = 5, 3$

$\rightarrow 2^x = 5, 3 \rightarrow x = \log_2 5, \log_2 3$

$(\log_{21} 3)^2 + \log_{21}^{147} = \log_{21}^{1323} - (\log_{21} 3)^2 + (\log_{21}^{21} + \log_{21}^7) / (\log_{21}^{21} + \log_{21}^3)$

$\rightarrow \log_{21}^3 = x \rightarrow x^2 + (1+1-x)(2+x) = x^2 + 4 - x^2 = 4$

$\log(x^2 - 2x + 1) + 3 \log(1-x) = 5 \rightarrow x-1 = t \rightarrow \log t^2 + 3 \log -t = 5$

$t^2 - t^3 = 10^5 \rightarrow -t^5 = 10^5 \rightarrow t = -10 \rightarrow x-1 = -10$

$x = -9 \rightarrow \log_3^{-9} = \log_3^9 = 2$

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

$x^3 = 16 \rightarrow x = \sqrt[3]{16} = \log_2 \sqrt[3]{16} = 4$

$$\log(2-x) - \log \frac{1}{(x-2)^2} = 3 \rightarrow 2-x-t - t \alpha (-t)^2 = 10^3$$

$$\rightarrow t^3 \cdot 10^3 - t \cdot 10 - 2-x \cdot 10 \rightarrow x = -8 \checkmark$$

$$\rightarrow \log \frac{8}{\sqrt{2}} = 2 \log_2 8 = \textcircled{6} \checkmark$$

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$$x^2 = 2 \cdot 81^x \rightarrow \frac{x^2}{3} = 2 \cdot \frac{4^x}{3} \rightarrow x^2 - 2 \cdot 4^x = 0$$

$$\rightarrow x = \frac{4 \pm \sqrt{24}}{2} = 2 \pm \sqrt{6}$$

$$\rightarrow \log \frac{\sqrt{6}}{2} = \textcircled{\frac{1}{2}} \checkmark$$

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v

$$\log_3^2 \frac{5}{8} \rightarrow \frac{\log 2 \cdot 5}{\log 3} = \frac{5}{8} \quad / \quad \log_{18}^8 = \frac{\log 8}{\log 18} = \frac{3 \log 2}{2 \log 3 + \log 2}$$

$$\rightarrow \frac{3(5)}{2(8)+5} = \frac{15}{21} = \textcircled{\frac{5}{7}} \checkmark$$

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$$\log_4^3 \frac{8}{10} = \frac{\log 3}{2 \log 2} = \frac{4}{5} \rightarrow \log_{12}^6 = \frac{\log 6}{\log 12} = \frac{\log 2 + \log 3}{2 \log 2 + \log 3}$$

$$\rightarrow \frac{(\frac{5}{2}) + 4}{5 + 4} = \frac{6.5}{9} = \textcircled{\frac{13}{18}} \checkmark$$

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$$(a \log 2) x^2 + a x + b \log 2 = 0 \rightarrow \text{صورتها} = -1 + x = \frac{-a}{a \log 2} = -\frac{1}{\log 2}$$

$$\rightarrow \text{ضرب در 2} = -1 + x = \frac{b \log 2}{a \log 2} = \frac{b}{a}$$

$$\rightarrow x = -\log 10 + 1 = \frac{b}{a} = -1 + \log 10$$

$$\rightarrow \frac{1}{\sqrt{2}} = \frac{\sqrt{10}}{\sqrt{2}} = \textcircled{\sqrt{5}} \checkmark$$

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