نام و نام خانوادگی ...ابوالفضل ابوفاضلی.... پاسخنامه تشریحی تکلیف شماره ...۲۴... کلاس ...یازدهم.....

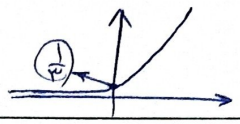
۱

$y = x^2 \longrightarrow \begin{cases} x=1 \Rightarrow y=1 \\ x=2 \Rightarrow y=4 \end{cases}$

$2^{Ax+b} = \begin{cases} x=1 \longrightarrow y=1 \Rightarrow A+b=0 \\ x=2 \longrightarrow y=4 \Rightarrow 2A+b=2 \end{cases}$

$2A=2 \longrightarrow A=1 \, , \, b=-1 \Rightarrow f(x) = 2^{x-1}$

$x=0 \Rightarrow 2^{0-1} = 2^{-1} = \frac{1}{2}$ ← عرض از مبدأ



۲

$\log_2^{4^x+15} = x+2 \Rightarrow 2^x \times 4 = 4^x + 15 \Rightarrow (2^x)^2 - 4(2^x) + 15 = 0$

$\Rightarrow (2^x-5)(2^x-3) = 0 \Rightarrow \begin{cases} 2^x = 5 \Rightarrow x = \log_2^5 \\ 2^x = 3 \Rightarrow x = \log_2^3 \end{cases}$

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

۳

$(\log_{21}^3)^2 + \log_{21}^{147} \log_{21}^{147\times 9} = (\log_{21}^3)^2 + \log_{21}^{147}(\log_{21}^{147} + 2\log_{21}^3)$

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

$= (\log_{21}^{3\times 7\times 7\times 3})^2 = (\log_{21}^{(21)^2})^2 = (2\log_{21}^{21})^2 = 4$

۴

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

$\Rightarrow x-1 = -10 \rightarrow x = -9$

$\log_3^9 = 2$

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

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

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

۶

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

$$\log_{10}^{x-2} = 1 \longrightarrow x-2 = 10 \longrightarrow x = -8$$

$$\log_{\sqrt{2}}^{(-x)} = \log_{\sqrt{2}}^{8} = \log_{2^{\frac{1}{2}}}^{2^3} = \frac{3}{\frac{1}{2}} \times \log_2^2 = 6$$

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$$3^{x^2-2} = 3^{4x} \longrightarrow x^2-2 = 4x \longrightarrow x^2-4x-2 = 0 \Rightarrow x = \begin{cases} \frac{4+\sqrt{24}}{2} = 2+\sqrt{6} \checkmark \\ \frac{4-\sqrt{24}}{2} = 2-\sqrt{6} \text{ غ ق ق} \end{cases}$$

$$\log_4^{x-2} = \log_4^{(2+\sqrt{6}-2)} = \log_4^{\sqrt{6}} = \frac{1}{2}$$

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$$\log_{3^2}^{2} = \frac{6}{8} \longrightarrow \log_3^3 = \frac{8}{6}$$

$$\log_{18}^{8} = 3\underbrace{\log_{18}^{2}}_{A} = 3A \Rightarrow \log_2^{18} = \frac{1}{A} \Rightarrow \frac{1}{A} = \log_3^{2\times3\times2} = \log_3^2 + \log_3^3 + \log_3^2$$

$$\Longrightarrow \frac{1}{A} = \frac{21}{6} \Rightarrow A = \frac{6}{21} \Rightarrow \log_{18}^{2} = \frac{6}{21} \Rightarrow 3\log_{18}^{2} = \log_{18}^{8} = 3\times\frac{6}{21} = \frac{6}{7}$$

۹

$$\log_{\frac{1}{4}}^{3} = 0/8 \Rightarrow \frac{1}{2}\log_2^3 = 0/8 \longrightarrow \log_2^3 = 1/4$$

$$\log_{12}^{4} = \frac{\log_2^4}{\log_2^{12}} = \frac{\log_2^4}{\log_2^{2\times2\times3}} = \frac{\log_2^4}{\log_2^2 + \log_2^2 + \log_2^3} = \frac{1+1/4}{1+1+1/4} = \frac{2/4}{3/4} = \frac{12}{18}$$

۱۰

$$(a\log 2)x^2 + ax + b\log 2 = 0 \xrightarrow{x=-1} a\log 2 - a + b\log 2 = 0$$

$$\Longrightarrow \log 2\,(a+b) - a = 0 \longrightarrow \log 2 = \frac{a}{a+b} \longrightarrow \log_2^{10} = \frac{a+b}{a} = 1+\frac{b}{a}$$

$$2^{\frac{a+b}{a}} = 2^{1+\frac{b}{a}} = 2\times2^{\frac{b}{a}} = 10 \longrightarrow 2^{\frac{b}{a}} = 5 \Rightarrow (\sqrt{2})^{\frac{b}{a}} = 5^{\frac{1}{2}} = \sqrt{5}$$