نام و نام خانوادگی ......صبا احمد...... پاسخنامه تشریحی تکلیف شماره ...۲۴... کلاس یازدهم B......

۱

$y = x^2$: $x = 3 \to y = 9 \quad (3,9)$; $x = 1 \to y = 1 \quad (1,1)$

$f(x) = 3^{Ax+B}$: $3^{A+B} = 1 = 3^0 \to A + B = 0 \to A = 1$; $3^{3A+B} = 9 = 3^2 \to 3A + B = 2 \to B = -1$

$f(x) = 3^{Ax+B} = 3^{x-1} \xrightarrow{x=0} y = \frac{1}{3}$ نقطه برخورد با محور عرض‌ها

۲

$2^{x+3} = 4^x + 15 \to 2^x \times 2^3 = (2^x)^2 + 15 \xrightarrow{2^x = t} 8t = t^2 + 15$

$\to t^2 - 8t + 15 = 0$: $t = 3 \to 2^x = 3 \to x = \log_2 3$; $t = 5 \to 2^x = 5 \to x = \log_2 5$

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

۳

$\log_{21} 147 = \log_{21} (21 \times 7) = \log_{21} 21 + \log_{21} 7 = 1 + \log_{21} 7 = 1 + \log_{21} 21 - \log_{21} 3 = 2 - \log_{21} 3$

$\log_{21} 1323 = \log_{21} 21^2 + \log_{21} 3 = 2\log_{21} 21 + \log_{21} 3 = 2 + \log_{21} 3$

$(\log_{21} 3)^2 + \log_{21} 147 + \log_{21} 1323 = (\log_{21} 3)^2 + \underbrace{(2 - \log_{21} 3)(2 + \log_{21} 3)}_{4 - (\log_{21} 3)^2} = 4$

۴

$\log(x^2 - 2x + 1) + 3\log(1 - x) = 5 \xrightarrow{1 - x = t} \log(t^2) + 3\log t = 5$

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

$\to 1 - x = 10 \to x = -9$; $\log_3 9 = 2$

۵

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

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

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

۶

$\log(2-x)=t \longrightarrow t^2+\log\left(\frac{1}{x-2}\right)^2-\log(2-x)=0 \longrightarrow t^2+\log(x-2)^{-2}-\log(2-x)=0$

$\longrightarrow t^2+(-2t)-t=0 \longrightarrow -t^2=-2 \rightarrow t=1 \longrightarrow \log_{10}^{2-x}=1 \rightarrow 2-x=10$

$\rightarrow x=-8$ $\qquad \log_2\sqrt{2}=\log_{2^{\frac{1}{2}}}^{2^3}=6\log_2^2=6$

۷

$2^{x^2-2}=18^x \longrightarrow x^2-2=4x \longrightarrow x^2-4x-2=0$ ✓ $x=2+\sqrt{6}$ ✗ $x=2-\sqrt{6}$

$\log_6^{x-2}=\log_6^{\sqrt{6}}=\frac{1}{2}$

۸

$\log_{18}^8=\frac{\log_3^8}{\log_3^{18}}=\frac{3\log_3^2}{\log_3^2+2\log_3^3}=2\left(\frac{a}{8}\right)=\frac{15}{12}=\frac{5}{4}$

۹

$\log_4^{0.1}=-0.1 \longrightarrow \frac{\log^3}{\log 4}=-0.1 \longrightarrow \frac{1}{2}\frac{\log^3}{\log 2}=-0.1 \longrightarrow \frac{\log^3}{\log 10}=-1.4$

$\rightarrow \log 3=1.4\log 2$

$\log_{12}^6=\frac{\log 6}{\log 12}=\frac{\log 2+\log 3}{2\log 2+\log 3}=\frac{\log 2+1.4\log 2}{2\log 2+1.4\log 2}=\frac{2.4}{3.4}$

۱۰