پاسخنامه درس ۲۴ الیسا جلالی

۱-
$f(1)=1 \quad f(3)=9$

$3^{A+B}=1 \quad 3^{3A+B}=9 \longrightarrow \frac{3^{3A+B}}{3^{A+B}}=3^{2A}=9 \quad 2A=2 \quad A=1 \quad B=-1$

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

۲-
$4^x+15=2^{x+3}$ ($2^x\times 8$) $\quad 4^x-8\times\underbrace{2^x}_{t}+15=0 \quad t^2-8t+15=0$

$(t-3)(t-5)=0 \quad 2^x=3 \quad 2^x=5$

$x=\log_2^3$ و $\log_2^5 \longrightarrow \log_2^3+\log_2^5=\log_2^{15}$

۳-
$(\log_{21}^3)^2+\log_{21}^{49\times3}\times\log_{21}^{7^2\times3}=(\log_{21}^3)^2+(\log_{21}^3+\underbrace{2\log_{21}^7}_{2-2\log_{21}^3})(2+\log_{21}^3)$

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

۴-
$\log_{(x^2-2x+1)}(1-x)^3=5$ ($(1-x)^2$) $\quad 10^5=(1-x)^5 \quad 1-x=10 \quad x=-9$

$\log_3^9=2$

۵-
$\log_2(x^2+2x+4)(x-2)=3 \quad x^3-8=8 \quad x^3=16 \quad x=\sqrt[3]{16}$

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

۶-
$\log\frac{2-x}{\frac{1}{(2-x)^2}}=3 \quad \log(2-x)^3=10^3 \quad 2-x=10 \quad x=-8$

$\log_{\sqrt{2}}^8=\frac{3}{\frac{1}{2}}=6$

۷-
$3^{x^2-2}=3^{4x} \quad x^2-4x-2=0 \quad (x-2)^2-6=0 \quad x-2=\pm\sqrt{6}$ قق

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

-8

$$\log_{8}^{18} = \frac{1}{3}\left(2\log_{2}^{3} + \log_{2}^{2}\right) = \frac{1}{3}\left(1 + 2\times\frac{8}{5}\right) = \frac{1}{3}\times\frac{21}{5} = \frac{7}{5}$$

$$\log_{18}^{8} = \frac{5}{7}$$

-9

$$\log_{12}^{6} = \frac{\log_{2}^{6}}{\log_{2}^{12}} = \frac{\log_{2}^{3} + 1\log_{2}^{2}}{\log_{2}^{2} + \log_{2}^{3}} = \frac{\frac{1}{2} + 0.8}{1 + 0.8} = \frac{1.3}{1.8} = \frac{13}{18}$$

-10

$$a\log 2 - a + b\log 2 = 0$$

$$S = \frac{-a}{a\log 2} = \frac{-1}{\log 2}$$

$$\alpha = -1$$

$$\beta = -\frac{1}{\log 2} + 1 = \frac{\log 2 - 1}{\log 2}$$

$$\alpha\beta = \frac{1 - \log 2}{\log 2} = \frac{b}{a} = \frac{\log 5}{\log 2} = \log_{2}^{5}$$

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