زهرا الارزانی — یازدهم دختر — تکلیف ۲۶ — ۲۰

**۱-**

$f(x) = 3^{Ax+B}$ , $y = x^2$ ، طول نقاط تقاطع : ۱ و ۳ $\rightarrow \left|{1 \atop 1}\right| , \left|{3 \atop 9}\right|$ ✓

$\begin{cases} A+B=0 \\ 3A+B=2 \end{cases} \rightarrow 2A = 2 \rightarrow \boxed{A=1} \rightarrow A+b=0 ,\ \xrightarrow{A=1} \boxed{B=-1}$

عرض نقطه تلاقی تابع f با محور y ها $= \frac{1}{3}$

**۲-**

$\log_2 (4^x+15) = x+3 \rightarrow 4^x + 15 = 2^x \times 8$ ✓

$\rightarrow (2^x-3)(2^x-5) = 0 \rightarrow x_1 = \log_2 3$ , $x_2 = \log_2 5$

$\rightarrow \log_2 3 + \log_2 5 = \boxed{\log_2 15}$

**۳-**

$(\log_{21} 3)^2 + \log_{21}(147) \cdot \log_{21}(1323) = (\log_{21} 3)^2 + 4 - (\log_{21} 3)^2 = \textcircled{4}$ ✓

($21 \times 7$ ، $21 \times 63$)

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

$1-\log_{21} 3$ $\qquad = 4 - (\log_{21} 3)^2$

**۴-**

$\log(x^2-2x+1) + 3\log(1-x) = 5$ ✓

$\log (x-1)^2(1-x)^3 = 5 \rightarrow \log (1-x)^5 = 5 \rightarrow 10^5 = (1-x)^5$

$\rightarrow 10 = 1-x \rightarrow x = -9 \rightarrow \log_3 -(-9) = \textcircled{2}$

5- $\log_2(x^2+2x+4) + \log_2(x-2) = 3$ , $\log_{\sqrt[3]{2}} x =$

$\log_2 (x^3-8) = 3 \to x^3-8 = 8 \to x = 2\sqrt[3]{2} \to \log_{\sqrt[3]{2}} 2\sqrt[3]{2} = \boxed{4}$

6- $\log(2-x) - \log\frac{1}{(x-2)^2} = 3$

$\log\frac{1}{(2-x)^2} = \log(2-x)^{-2} = -2\log(2-x)$

$3\log(2-x) = 3 \to 2-x = 10 \to x = -8$ , $\log_{\sqrt{2}} -(-8) = \boxed{6}$

7- $3^{x^2-2} = 81^x = 3^{4x}$ , $\log_6 (x-2) = \log_6 \sqrt{6} = \boxed{\frac{1}{2}}$

$x^2-2 = 4x \to x^2-4x+4-6=0 \to (x-2)^2 = 6 \to x-2 = \sqrt{6}$

8- $\log_3 2 = \frac{5}{8}$ , $\log_{18} 8 = \frac{3\log 2}{\log 2 + 2\log 3} = \frac{3(5a)}{5a+2(8a)} = \frac{15a}{21a} = \boxed{\frac{5}{7}}$

$\frac{\log 2}{\log 3} = \frac{5}{8} \to \log 2 = 5a$

$\log 3 = 8a$

9- $\log_4 3 = 0/8$ , $\log_{12} 6 = \frac{\log 2 + \log 3}{2\log 2 + \log 3} = \frac{5a+8a}{10a+8a} = \frac{13a}{18a} = \boxed{\frac{13}{18}}$

$\frac{\log 3}{2\log 2} = \frac{4}{5} \to \frac{\log 3}{\log 2} = \frac{8}{5} \to \log 3 = 8a$ و $\log 2 = 5a$

10- $(a\log 2)x^2 + ax + b\log 2 = 0$ , $(\sqrt{2})^{\frac{b}{a}} =$

$x=-1 \to a\log 2 - a + b\log 2 = 0 \to (a+b)\log 2 = a \to \log 2 = \frac{a}{a+b}$

$\to \frac{1}{\log_2 10} = \frac{a}{a+b} \to \log_2 10 = \frac{a+b}{a} = 1 + \frac{b}{a} \to \log_2 10 - 1 = \frac{b}{a} \to \frac{b}{a} = \log_2 5$

($1 = \log_2 2$)

$(\sqrt{2})^{\log_2 5} = 5^{\log_2 \sqrt{2}} = \boxed{\sqrt{5}}$