1

$f(x) = 3^{Ax+B}$

$y = x^2$

$f(1) = 1 \rightarrow 3^{A+B} = 1 \rightarrow A+B = 0$
$f(2) = 9 \rightarrow 3^{2A+B} = 9 \rightarrow 2A+B = 2$ } $A = 1 \quad B = -1$

$f(x) = 3^{x-1}$

نقاط تقاطع $\rightarrow \begin{vmatrix} 1 \\ 1 \end{vmatrix}$ و $\begin{vmatrix} 3 \\ 9 \end{vmatrix}$

$f(0) = 3^{-1} = \frac{1}{3}$ عرض از مبدأ $\begin{vmatrix} 0 \\ \frac{1}{3} \end{vmatrix}$

عرض نقطه تلاقی با y : $\frac{1}{3}$ ✓

(۲)

2

مجموع جواب { $\log_2^3 + \log_2^5 = \log_2^{15}$ ✓

(۲)

$\log_2 (4^x + 15) = x + 3$

$2^{2x} + 15 = 2^{x+3}$

$2^{2x} - 2^{x+3} = -15 \rightarrow (2^x)^2 - 8 \cdot 2^x + 15 = 0 \rightarrow a^2 - 8a + 15 = 0$

$a \begin{cases} 3 \rightarrow 2^x = 3 \rightarrow \log_2^3 ✓ \\ 5 \rightarrow 2^x = 5 \rightarrow \log_2^5 ✓ \end{cases}$

3

$(\log_{21}^3)^2 + \log_{21}^{147} \cdot \log_{21}^{1323} = (\log_{21}^3)^2 + (1 + \log_{21}^7)(2 + \log_{21}^3) = (\log_{21}^3)^2 + (2 - \log_{21}^3)(2 + \log_{21}^3)$

$\hookrightarrow = (\log_{21}^3)^2 + 4 - (\log_{21}^3)^2 = 4$ ✓

(۲)

$\downarrow \quad \log_{21}^7 + \log_{21}^{21}$

$\downarrow \quad 2\log_{21}^{21} + \log_{21}^3$

$\log_{21}^7 + \log_{21}^3 = \log_{21}^{21} = 1$

$\log_{21}^7 = 1 - \log_{21}^3$

4

$\log^{x^2 - 2x + 1} + 3\log^{1-x} = 5$

(۲)

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

$x = -9$ ✓

$\log_3^{-x} = ? \quad \log_3^9 = 2$ ✓

5

$\log_2^{x^2 + 2x + 4} + \log_2^{x-2} = 3$

(۲)

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

$x^3 = 16$

$\log_{\sqrt[3]{2}}^x \rightarrow \log_{2^{\frac{1}{3}}}^{2^{\frac{4}{3}}} = 4$ ✓ $\qquad x = 2^{\frac{4}{3}}$

۶

۲

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

$\log^{(2-x)(x-2)^2} = 2 \rightarrow \log^{(2-x)^3} = 3 \rightarrow 2-x = 1 \quad x = -1$ ✓

$\log_{\sqrt{2}}^{-x} = ?$ $\log_{\sqrt{2}}^{8} = 2\log_2^8 = 6$ ✓

۷

۲

$2^{x^2-2} = 16^x$ $2^{x^2-2} = 2^{4x}$

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

$\log_4^{x-2} = ?$ $x-2 = \pm\sqrt{6}$

$\log_4^{-\sqrt{6}} = X$ $\log_4^{\sqrt{6}} = \frac{1}{2}$ ✓

۸

۲

$\log_2^x = \frac{a}{8} \rightarrow \log_2^x = \frac{3}{8}$

$\log_{16}^8 = ?$ $2\log_{16}^2 = 2\frac{1}{\log_2^{16}} = 2\frac{1}{\log_2^2+\log_2^2+\log_2^2+\log_2^2} = \frac{2}{1+2\log_2^2} \rightarrow \frac{2}{1+2(\frac{3}{8})} = \frac{8}{7}$ ✓

۹

۲

$\log_{0.16}^4 = 2$ $\log_2^4 = 1.4$ $\log_{2^x}^2 = \frac{a}{8}$

$\log_{12}^4 = ?$ $\log_{12}^2 + \log_{12}^2 = \frac{1}{2+1.4} + \frac{1}{1+2(\frac{a}{8})} = \frac{a}{16} + \frac{8}{16} = \frac{13}{16}$ ✓

$\frac{1}{2+\log_2^2}$ $\frac{1}{1+2\log_2^2}$

۱۰

۲

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

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

$\frac{b+a}{a}\log^2 = 1 \rightarrow \log^{2^{\frac{b+a}{a}}} = \log 10$

$2^{\frac{b+a}{a}} = 10$ $\frac{b+a}{a} = \log_2^{10}$

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

$\sqrt{2}^{\frac{b}{a}} = ?$ $(2^{\frac{1}{2}})^{\log_2^5} = \sqrt{5}$ ✓