شایان رومی زاده

$a \mid \frac{1}{1} \quad b \mid \frac{3}{9} \quad f_{(3)} = 3^{3A+B} = 3^2$

$f_{(1)} = 3^{A+B} = 3^0$

1

$\rightarrow 3A+B=2$
$\rightarrow A+B=0$ $\longrightarrow 2A=2 \rightarrow A=1 \rightarrow B=-1$

$\Rightarrow y=? \rightarrow f_{(0)} = 3^{0-1} = \frac{1}{3}$
$x=0$

$f_{(x)} = 3^{x-1} \rightarrow 3^{0-1} = \frac{1}{3} \qquad \rightarrow \boxed{(0, \frac{1}{3})}$

$4^x + 15 > 0 \rightarrow$ همواره برقرار

$2^{x+3} = 2^{2x} + 15 \xrightarrow{2^x = t} t^2 - 8t + 15 = 0 \longrightarrow (t-3)(t-5) = 0$

2

$2^{x+3} = 2^x \times 2^3 = 8 \times 2^x = 8t$

$\begin{array}{ccccc} & 3 & & 5 & \\ \hline + & \phi & - & \phi & + \end{array}$

$\rightarrow t=3 \rightarrow 2^x = 3 \rightarrow x = \log_2^3 \rightarrow \log_2^3 + \log_2^5 = \boxed{\log_2^{15}}$

$t=5 \rightarrow 2^x = 5 \rightarrow x = \log_2^5$

$\begin{array}{c|c} 147 & 3 \\ 49 & 7 \\ 7 & 7 \\ 1 & \end{array} \qquad \begin{array}{c|c} 1323 & 3 \\ 441 & 3 \\ 147 & 3 \\ 49 & 7 \\ 7 & 7 \\ 1 & \end{array} \qquad \log_{21}^3 = m \ , \ \log_{21}^7 = n$

$= m^2 + (\log_{21}^3 + 2\log_{21}^7)(3\log_{21}^3 + 2\log_{21}^7) = m^2 + (m+2n)(3m+2n)$

3

$= 4m^2 + 4n^2 + 8mn = 4(m+n)^2 = 4(\log_{21}^3 + \log_{21}^7)^2 = 4(\log_{21}^{21})^2 = \boxed{4}$

$1-x>0 \rightarrow |\sqrt{(x-1)^2}| = 1-x$

$(x^2 - 2x + 1) \cancel{2} (x-1)^2$

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

$\rightarrow x = -9$

4

$\log_3^{(1-x)} = \log_3^9 = \boxed{2}$

$(x^2 + 2x + 4) = \frac{x^3 - 8}{x-2}$

$= \log_2^{x^3-8} - \log_2^{x-2} + \log_2^{x-2} = \log_2^{x^3-8} = 3 \rightarrow x^3 - 8 = 8 \rightarrow x = 2\sqrt[3]{2}$

5

$\log_{\sqrt{2}}^{2\sqrt[3]{2}} = \log_{2^{\frac{1}{2}}}^{2^{\frac{4}{3}}} = \frac{\frac{4}{3}}{\frac{1}{2}} \log_2^2 = \boxed{4}$

$$= \log^{2-x} - \log^{(2-x)^{-2}} = 3\log^{2-x} = 3 \rightarrow \log_{10}^{2-x} = 1 \rightarrow 2-x=10 \rightarrow x=-8$$

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

$$3^{x^2-2} = 3^{4x} \rightarrow x^2-2=4x \rightarrow x^2-4x-2=0 \rightarrow x = \frac{4 \pm \sqrt{16+8}}{2}$$

$$x = \frac{4+2\sqrt{6}}{2} = 2+\sqrt{6} \longrightarrow \log_{6}^{x-2} = \log_{6}^{2+\sqrt{6}-2} = \log_{6}^{\sqrt{6}} = \boxed{\frac{1}{2}}$$ 7

$x = \frac{4-2\sqrt{6}}{2} < 0$ غ ق ق

$$\log_{18}^{8} = \frac{\log_{27}^{8}}{\log_{27}^{18}} = \frac{\frac{3}{3}\log_{3}^{2}}{\frac{1}{3}\log_{3}^{2}+\frac{2}{3}\log_{3}^{3}} = \frac{\frac{5}{8}}{\frac{5}{24}+\frac{2}{3}} = \frac{\frac{5}{8}}{\frac{21}{24}} = \boxed{\frac{5}{7}}$$ 8

$$\log_{12}^{6} = \frac{\log_{4}^{6}}{\log_{4}^{12}} = \frac{\frac{1}{2}\log_{2}^{2} + \log_{4}^{3}}{\log_{4}^{3}+\log_{4}^{4}} = \frac{\frac{1}{2}+\frac{8}{10}}{\frac{8}{10}+1} = \frac{\frac{13}{10}}{\frac{18}{10}} = \boxed{\frac{13}{18}}$$ 9

$$x=-1 \rightarrow (a\log^{2}) + (-a) + b\log^{2} = 0 \rightarrow \log^{2^a} + \log^{2^b} - \log_{10}^{10^a} = 0$$

$$(a+b)\log^{2} = a$$

$$\log^{\frac{2^{a+b}}{10^a}} = 0 \rightarrow \frac{2^{a+b}}{10^a} = 1 \rightarrow 2^a \times 2^b = 2^a \times 5^a \rightarrow 2^b = 5^a \rightarrow \log_{2}^{5^a} = b \rightarrow a\log_{2}^{5} = b$$ 10

$$\rightarrow \frac{b}{a} = \log_{2}^{5} \longrightarrow \sqrt{2}^{\log_{2}^{5}} = 5^{\log_{2}^{\sqrt{2}}} = 5^{\frac{1}{2}} = \boxed{\sqrt{5}}$$