درسا صادقی

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۱)

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

$$3^{3A+B} = 3^{2} \longrightarrow 3A+B=2 \quad \begin{cases} -A+B=0 \\ 3A+B=2 \end{cases} \quad 3A-A=2 \quad \boxed{A=1,\ B=-1}$$

$$f(x) = 3^{x-1} \longrightarrow y=\frac{1}{3} \longrightarrow (0, \frac{1}{3})$$

۲ (circled)

۲)

$$\log_2 (4^x+16) = x+3 \longrightarrow 2^{x+3} = 4^x + 16 \longrightarrow 2^x \times 8 = 2^{2x} + 16$$

$$t^2 - 8t + 16 = 0$$

$$(t-4)(t-4) = t = 4$$

$$2^x = 4$$

$$2^x = 4 \longrightarrow \log_2 4 = x$$

$$2^x = 4 \longrightarrow \log_2 4 = x$$

$$\log_2 3 + \log_2 5 = \log_2 15$$

۲ (circled)

۳)

$$(\log_{21} 3)^2 + (2\log_{21} 7 - \log_{21} 3)(3\log_{21} 3 + 2\log_{21} 7) \quad \boxed{\log_{21} 3 = t}$$

$$\log_{21} 7 = \log_{21} 21 - \log_{21} 3 \longrightarrow t^2 + (2-2t+t)(3t+2-2t)$$

$$t^2 + (2-t)(t+2) = t^2 + 4 - t^2 = 4$$

۲ (circled)

۴)

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

$$\log (1-x)^2 \longrightarrow 2\log (1-x) + 3\log (1-x) = 5\log (1-x) = 5$$

$$\log (1-x) = 1 \longrightarrow 10 = 1-x$$

$$x=-9$$

۴ (circled)

۵)

$$\log_2 (x^2+2x+4) + \log_2 (x-2) = 3 \quad \log_2 (x^2+2x+4)(x-2) =$$

$$\log_2 x^3-8 = 3 \longrightarrow x = \sqrt[3]{16} = 2^{\frac{4}{3}} \quad \log_{\frac{1}{2}} x = \log_{\frac{1}{2}} 2^{\frac{4}{3}}$$

$$4\log_2 2 = 4$$

۵ (circled)

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

$(2-x)^3 = 10^3 \longrightarrow 2-x = 10 \rightarrow x = -8$ ⑤

$\log_{\sqrt{2}}(-x) = \log_{2^{\frac{1}{2}}} 2^3 = 6\log_2 2 = 6$

٧) $x = 2+\sqrt{6}$

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

$3^{x^2-2} = 81^x$

$3^{x^2-2} = 3^{4x}$

$x^2 - 4x - 2 = 0$

$\Delta = 24 \longrightarrow \frac{4 \pm 2\sqrt{6}}{2}$ ⑤

$\frac{4-2\sqrt{6}}{2} \rightarrow$ غ ق ق

٨) $\log_{18} 8 = \frac{3\log_3 2}{\log_3 18} = \frac{3\log_3 2}{2\log_3 3 + \log_3 2} = \frac{\frac{15}{8}}{2+\frac{5}{8}} = \frac{15}{8} \times \frac{8}{21} = \frac{5}{7}$ ⑤

سوال ٩) $\log_{12} 6 = \frac{\log_2 3 + \log_2 2}{2\log_2 2 + \log_2 3} = \frac{1.6+1}{2+1.6}$ $\quad \log_2 3 = 1.6$

$\frac{26 \times 10}{10 \times 36} = \frac{13}{18}$ ⑤

١٠) $(a\log 2)x^2 + ax + b\log 2 = 0$ $\quad (x = -1)$

$a\log 2 - a + b\log 2 \longrightarrow b\log 2 = a - a\log 2$ ⑤

$b\log 2 = a(1-\log 2) = \frac{b}{a} = \frac{1-\log 2}{\log 2} = \frac{\log 5}{\log 2} = \log_2 5$

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