پاسخ تشریحی یازدهم ریاضی A نهایی

①

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

$y = x^2 \rightarrow x = 1$ و $3 \Rightarrow (1,1)$ و $(3,9)$

$\rightarrow (1,1) \Rightarrow 3^{A+B} = 1 \rightarrow A+B=0$

$\rightarrow (3,9) \Rightarrow 3^{3A+B} = 3^2 \rightarrow 3A+B=2$

$\} \rightarrow A=1$ و $B=-1$

تلاقی با محور yها $\Rightarrow x=0 \rightarrow 3^{A(0)+B} = 3^B = 3^{-1} = \boxed{\frac{1}{3}} \leftarrow$ جواب

②

$4^x + 15 = 2^{(x+3)} \Rightarrow 4^x + 15 = 2^x \times 8$

$\rightarrow 2^{2x} + 15 = 2^x \times 8 \rightarrow (2^x \times 8) - 2^{2x} = 15$

$\rightarrow 2^x(8 - 2^x) = 15 \rightarrow 2^x = 3$ یا $2^x = 5 \rightarrow x = \log_2^3$ یا $\log_2^5$

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

③

$\log_{21}^{147} = \log_{21}^{21\times7} = \log_{21}^{7} + 1$

$\log_{21}^{1323} = \log_{21}^{21^2\times3} = 2 + \log_{21}^{3}$

$\} \xrightarrow{\times} \log_{21}^{7} + \log_{21}^{7}\times\log_{21}^{3} + 2 + \log_{21}^{3}$

$3 + \log_{21}^{21} = \textcircled{4} \leftarrow$ جواب

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(۴)

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

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

$\to 1-x = 10 \to x = -9 \longrightarrow$ خواسته سوال $\Rightarrow \log_3 9 = 2$ ← جواب

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(۵)

اتحاد چاق و لاغر $\Rightarrow \log_2 (x-2)(x^2+2x+4) = \log_2 (x^3-8) = 3$

$\to x^3 = 16 \to x = \sqrt[3]{2^4} \longrightarrow$ خواسته سوال $= \log_{\sqrt[3]{2}} \sqrt[3]{2^4} = 4$ ← جواب

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(۶)

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

$\to (2-x)^3 = 10^3 \to 2-x = 10 \to x = -8 \to$ خواسته سوال $\log_{\sqrt{2}} 8 = 6$ ← جواب

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(۷)

$3^{x^2-2} = 3^{4x} \Rightarrow x^2-4x-2 = 0 \to (x-2)^2 - 6 = 0$

$\to x-2 = \pm\sqrt{6} \to x = 2\pm\sqrt{6}$

چون داریم لگاریتم می‌گیریم پس منفی غ ق ق است

$\to \log_6 (\sqrt{6}+2-2) = \log_6 \sqrt{6} = \frac{1}{2}$ ← جواب

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(۸)

$\log_{18} 8 = \frac{\log 8}{\log 18} = \frac{3\log 2}{2\log 3 + \log 2} = \frac{3\times\frac{5}{8}\log 3}{2\log 3 + \frac{5}{8}\log 3} = \frac{15}{21} = \frac{5}{7}$ ← جواب

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

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(۹)

$\log_4 3 = \frac{4}{5} \to \frac{\log 3}{\log 4} = \frac{4}{5} \Rightarrow \frac{4}{5}\log 4 = \log 3$

$\to \log_{12} 6 = \frac{\log_2 6}{\log_2 12} = \frac{\overset{1.6}{\log_2 3} + \overset{1}{\log_2 2}}{\underset{1.6}{\log_2 3} + \underset{2}{2\log_2 2}} = \boxed{\frac{2.6}{3.6} = \frac{13}{18}}$

جواب

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(۱۰)

$(a\log 2)(-1)^2 + a(-1) + b(\log 2) = 0$

$\to a\log 2 - a + b\log 2 = 0 \to \log 2(a+b) = a$

$\Rightarrow 2^{a+b} = 10^a \to 2^b = 5^a \to \frac{b}{a} = \log_2 5$

خواسته سوال $\Rightarrow \sqrt{2}^{\log_2 5} \Rightarrow 5^{\log_2 \sqrt{2}} = 5^{\frac{1}{2}} = 5^{\frac{1}{2}} = \boxed{\sqrt{5}}$

جواب سوال