۲۰

(۱)

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

(۲)

$y = x^r \rightarrow q = b^r \Rightarrow (1, r), (r, q)$

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

$\rightarrow (r, q) \Rightarrow r^{rA+B} = r^r \rightarrow rA+B = r$ $\Big\} \rightarrow A = 1, B = -1$

عرض از مبدأ $\Rightarrow x = 0 \rightarrow r^{A(0)+B} = r^B = r^{-1} = \frac{1}{r}$ ← جواب

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(۴)

(۲)

$r^{x+r} + 16 = r^{(x+r)} \Rightarrow r^{x+r} + 16 = r^x \times 8$

$\rightarrow r^{rx} + 16 = r^x \times 8 \rightarrow (r^x \times 8) - r^{rx} = 16$

$\rightarrow r^x (8 - r^x) = 16 \rightarrow r^x = r \text{ یا } r^x = 5 \rightarrow x = \log_r^r \text{ یا } \log_r^5$

$\log_r^r + \log_r^5 = \log_r^{15}$

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(۳)

(۲)

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

$\log_{21}^{1323} = \log_{21}^{21^2 \times 3} = 2 + \log_{21}^3$ $\Big\} \xrightarrow{+} 1 + \log_{21}^7 + \log_{21}^7 \times \log_7^3 + 2 + \log_{21}^3$

1

$3 + \log_{21}^{21} = 4$ ← جواب

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⑥ (۲)

$\log(1-x)^2 + 2\log(1-x) - 5 = 0$

$\xrightarrow{\delta = \log(1-x)} 2\delta + \delta - 5 = 0 \rightarrow \log(1-x) = 1$

$\rightarrow 1-x = 10 \rightarrow x = -9$ ✓ $\longrightarrow$ خواسته سوال $\Rightarrow \log_3 9 = 2$ ← جواب (۲)

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

$\rightarrow x^3 = 14 \rightarrow x = \sqrt[3]{14}$ ✓ $\longrightarrow$ خواسته سوال $= \log_{\sqrt[3]{2}} \sqrt[3]{14} = 3$ ← جواب (۳) ✓

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

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

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⑦ (۲) $3^{x^2-2} = 3^{4x} \Rightarrow x^2 - 4x - 2 = 0 \rightarrow (x-2)^2 - 6 = 0$

$\rightarrow x - 2 = \pm\sqrt{6} \rightarrow x = 2 \pm \sqrt{6}$ ← چون داخل لگاریتم نباید منفی باشد غ ق ق است

$\rightarrow \log_6^{\sqrt{6}+2-2} = \log_6^{\sqrt{6}} = \frac{1}{2}$ ← جواب

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⑧ (۲) $\log_{18}^8 = \frac{\log 8}{\log 18} = \frac{3\log 2}{\log 2 + 2\log 3} = \frac{3\times 5 \log 2}{2\log 3 + 5\log 2} = \frac{15}{21} = \frac{5}{7}$ ✓

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

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$\log_{16}^{4} = \frac{4}{5} \rightarrow \frac{\log 4}{\log 16} = \frac{4}{5} \Rightarrow \frac{4}{5}\log 16 = \log 4$ (۹) (۲)

$\rightarrow \log_{12}^{6} = \frac{\log_2 6}{\log_2 12} = \frac{\log_2 2 + \log_2 3}{2\log_2 2 + \log_2 3} = \frac{1 + 1{,}6}{2 + 1{,}6} = \frac{2{,}6}{3{,}6} = \frac{13}{18}$ ✓

جواب ب

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(۱۰) (۲)

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

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

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

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

جواب سوال