لیلا همدانی

۱- تمیز و خوانا نوشته شود (۲۰)

$3^{A+B} = 1$ $\qquad -A-B = ۰$

$3^{2A+B} = 9$ $\qquad 2A+B = 2$

$2A = 2$

$A = 1$

$B = -1$

$3^{x-1} = 3^{-1} \rightarrow \frac{1}{3}$

(۱)

۲-

$\log_2(2^x+15) = x+3$

$(2)^{x+3} = 4^x + 15$

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

$A \qquad A^2$

$A^2 - 8A + 15 = 0$

$(A-5)(A-3) = 0$

$5 \qquad 3$

$2^x = 5 \qquad 2^x = 3$

$\log_2 5 = x$, $\log_2 3 = x$ $\quad \log_2 3$

$\log_2 3 + \log_2 5$ $\quad \log_2 15$

(۲)

۳-

$\log_{21}3 \times \log_{21}7 + \log_{21}(21\times7) \times \log_{21}(21^2\times3)$

$(\log_{21}3)^2 + [\log_{21}21 + \log_{21}7] + [\log_{21}21^2 + \log_{21}3]$

$(\log_{21}3)^2 + [1 + \log_{21}7] + [2 + \log_{21}3]$

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

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

جواب ۴

(۲)

$\log_{\frac{1}{3}}^{(x-1)^2} + \log_{\frac{1}{3}}^{(1-x)^2} = 0$

$\log_{\frac{1}{3}}^{-(x-1)^2} = \log_{\frac{1}{3}}^{0}$

$x-1 = -1 \quad \text{و} \quad x-1 = 1$

$x = 0 \quad \text{و} \quad x = -2$

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

$(x-4)(x+2) = 8$

$x^2 - 2x - 8 = 8$

$x^2 - 2x - 16 = 0$

$x = \frac{2 \pm \sqrt{4+64}}{2} = \frac{2 \pm 2\sqrt{17}}{2} = 1 \pm \sqrt{17}$

$\log \frac{x-2}{\frac{1}{(x-2)^2}} = \log 1000$

$(x-2)^3 = 1000$

$x-2 = 10 \quad \text{و} \quad x-2 = -10$

$x = 12 \quad \text{و} \quad x = -8$

۷ - نقاط صدا...

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

$x^2 - 2 = 2x$

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

$(x-1)^2 - 3 = 0$

$|x-1|^2 = 3$

$x - 1 = \sqrt{3}$

$\log_3 (x-1)^{\sqrt{3}}$ ... $= \frac{1}{2}$

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۸ -

$\frac{\log 8}{\log 18} = \frac{3}{\log \frac{9}{2} + \log \frac{4}{2}} = \frac{5 \times 3}{21} = \frac{5}{7}$

$\frac{16}{5} \quad \frac{21}{5}$

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$2 \log \frac{3}{2} = \frac{16}{5}$ ... $\frac{8}{5}$

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۹)

$\frac{\log 6}{\log 12} = \frac{\log 2^{\frac{1}{2}} + \log 3 \; 0/8}{\log \frac{3}{4} + \log \frac{4}{1}} \rightarrow \frac{1/3}{1/8}$

$0/8$

۲

گزینه ۱

$x_1 = -1 \quad , \quad \frac{c}{a} = x_1 x_2 = \frac{b \log 2}{a \log 2} = \frac{b}{a} \rightarrow x_2 = -\frac{b}{a}$

$\rightarrow \begin{matrix} x_1 = -1 \\ x_2 = -\frac{b}{a} \end{matrix} \rightarrow x_1 + x_2 = -1 - \frac{b}{a}$

$-1 - \frac{b}{a} = x_1 + x_2 = \frac{-a}{a \log 2}$

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

$\frac{b}{a} = 1 - \frac{1}{\log 2} \rightarrow \frac{b}{a} = \frac{1 - \log 2}{\log 2} = \frac{\log 5}{\log 2}$

$\boxed{\frac{b}{a} = \log_2 5}$

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

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

$\rightarrow \sqrt{5}$

گزینه ۱