

1

$$\begin{cases} 3^{A+13} = 1 \Rightarrow A+13=0 \\ 3^{3A+13} = 9 \Rightarrow 3A+13=2 \end{cases} \xrightarrow{\text{دستگاه}} \begin{cases} A = -13 \\ 3A = -11 \end{cases} \rightarrow \text{تضاد}$$

2

$$e^{x+10} = 2^{x+5} \rightarrow (2^x)^{\frac{x+5}{x+10}} = 2^{x+5} \rightarrow \frac{x+5}{x+10} = x+5 \rightarrow (x-5)(x-4) = 0$$

قبول اولی را می‌کنیم زیرا $e^{x+10} > 2^{x+5}$ و $e^{x+10} < 2^{x+5}$
 جواب: $x = 4$

3

$$\begin{aligned} \log_{x+1}^{x+5} &= \log_{x+1}^x + 2 \log_{x+1}^5 \\ \log_{x+1}^{x+5} &= 2 \log_{x+1}^x + \log_{x+1}^5 \end{aligned} \xrightarrow{\text{تساوی}} (\log_{x+1}^x)^2 + 2 \log_{x+1}^x + \log_{x+1}^5 = 2 \log_{x+1}^x + \log_{x+1}^5 + \log_{x+1}^5$$

4

$$2 \log_{x+1}^{(1-x)^2} + 3 \log_{x+1}^{(1-x)} = 5 \rightarrow 2 \log_{x+1}^{(1-x)^2} = 5 - 3 \log_{x+1}^{(1-x)} \rightarrow \log_{x+1}^{(1-x)^2} = \frac{5 - 3 \log_{x+1}^{(1-x)}}{2}$$

5

$$(x^2 + 2x + 5)(x-2) = 1 \rightarrow x^3 - 2x^2 + 2x^2 - 4x + 5x - 10 = 1 \rightarrow x^3 - 1 = 0$$

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

$\Delta < 0$
 ریشه ندارد

6

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

$$\Rightarrow (x-2)^3 = 1 \Rightarrow x-2 = 1 \Rightarrow x = 3$$

7

$$x^{2x} = e^{2x} \rightarrow x^2 - 2 = e^{2x} \rightarrow x^2 - 2x - 2 = 0 \rightarrow x = \frac{2 \pm \sqrt{4+8}}{2} = 1 \pm \sqrt{3}$$

$x > 2 \rightarrow x = 1 + \sqrt{3}$
 قابل قبول نیست

8

$$\log_{x^2}^x = \frac{\log_{x^2}^x}{\log_{x^2}^x} = \frac{2 \log_x^x}{2 + \log_x^2} = \frac{2 \times \frac{1}{2}}{2 + \frac{1}{2}} = \frac{1}{\frac{5}{2}} = \frac{2}{5}$$

9

$$\frac{\log_{x^2}^x}{\log_x^x} = \frac{1/2 + \log_x^2}{1 + \log_x^2} = \frac{\frac{1}{2} + \frac{1}{2}}{\frac{1}{2} + \frac{1}{2}} = \frac{1}{1} = 1$$

$$\begin{aligned}
3) \quad & (y_{r1}^m)^r + y_{r1}^{v \times r1} y_{r1}^{q \times r1} = (y_{r1}^m)^r + (y_{r1}^v + y_{r1}^{r1}) (y_{r1}^{q \times r1} + y_{r1}^{r1}) \\
& = (y_{r1}^m)^r + (y_{r1}^{r1} + 1) (1 + y_{r1}^{r1 \times r1}) \\
& = (y_{r1}^m)^r + (1 - y_{r1}^m + 1) (1 + 1 + y_{r1}^m) \\
& = (y_{r1}^m)^r + (2 - y_{r1}^m) (2 + y_{r1}^m) = K
\end{aligned}$$