

الف) $y = \frac{\sin x - 2}{2 \cos x + 1} = \cos x = -\frac{1}{2} \Rightarrow \cos x = -\frac{1}{2}$ مخرج
 $x = \frac{2\pi}{3} + 2n\pi$ و $x = \frac{4\pi}{3} + 2n\pi$ $n \in \mathbb{Z}$ دامنه: $R - \frac{2\pi}{3} + 2n\pi$ و $\frac{4\pi}{3} + 2n\pi$
 ب) $y = \frac{\sin x + 3}{\cos x - 1} = \cos x = 1 \Rightarrow \cos x - 1 = 0$ مخرج
 $x = 2n\pi$ $n \in \mathbb{Z}$ دامنه: $R - 2n\pi$

الف) $y = \frac{2 \sin x + 1}{\tan x + 1} = \tan x = -1 \Rightarrow \tan x = -1$ زاویه های کمره
 $x = -\frac{\pi}{4} + n\pi$ $n \in \mathbb{Z}$ دامنه: $R - \frac{\pi}{4} + n\pi$ و $\frac{3\pi}{4} + n\pi$
 ب) $y = \frac{\cos x + 1}{\cot x - 1} = \cot x = 1 \Rightarrow \cot x = 1$ زاویه های کمره
 $x = \frac{\pi}{4} + n\pi$ $n \in \mathbb{Z}$ دامنه: $R - \frac{\pi}{4} + n\pi$ و $\frac{5\pi}{4} + n\pi$

الف) $\sin y = x^2 - 2 = -1 \leq \sin y \leq 1 \Rightarrow -1 \leq x^2 - 2 \leq 1$ ترکیب شرط
 $1 \leq x^2 \leq 3 \Rightarrow \sqrt{1} \leq |x| \leq \sqrt{3} \Rightarrow x \in [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$ دامنه: $[-\sqrt{3}, -1] \cup [1, \sqrt{3}]$
 ب) $y = \arccos(\sqrt{x} - 3) = x - 3 \geq 0 \Rightarrow x \geq 3$ و $-1 \leq \sqrt{x} - 3 \leq 1$
 $\sqrt{x} - 3 \leq 1 \Rightarrow \sqrt{x} \leq 4 \Rightarrow x \leq 16$ و $\sqrt{x} - 3 \geq -1 \Rightarrow \sqrt{x} \geq 2 \Rightarrow x \geq 4$
 ترکیب شرط: $4 \leq x \leq 16$ دامنه: $[4, 16]$

الف) $\cos y = |x| - 3 = -1 \leq \cos y \leq 1 \Rightarrow -1 \leq |x| - 3 \leq 1$ ترکیب شرط
 $2 \leq |x| \leq 4 \Rightarrow x \in [-4, -2] \cup [2, 4]$ دامنه: $[-4, -2] \cup [2, 4]$
 ب) $y = \arcsin(x^2 + 3x + 1) = -1 \leq x^2 + 3x + 1 \leq 1$ ترکیب شرط
 $-2 \leq x \leq 0$ و $x(x+3) \leq 0 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0$
 $x \geq -1$ و $x \leq -2$ و $x(x+1) > 0 \Rightarrow x^2 + x > 0 \Rightarrow x(x+1) > 0$
 ترکیب شرط: $[-2, -1] \cup [0, 1]$ دامنه: $[-2, -1] \cup [0, 1]$

الف) $y = \log_2 x^2 - 4 = x^2 > 0 \Rightarrow x \neq 0$ برای همی اعداد حقیقی غیر صفر
 است. دامنه: $R - \{0\}$ یا $(-\infty, 0) \cup (0, +\infty)$
 ب) $y = \log_2 \sqrt{1-x} = y \geq 1 - |x| \Rightarrow y \geq \log_2 2 - x = 1 - |x| \Rightarrow$
 $x \in (-\infty, +\infty)$ دامنه: R

$$y = \log_{x-3} \omega - x = y = \log_{x-3} (\omega - x) \Rightarrow \omega - x > 0 \Rightarrow x < \omega$$

$$x - 3 > 0 \Rightarrow x > 3$$

$$x - 3 \neq 1 \Rightarrow x \neq 4 \Rightarrow x \neq 4, 3 < x < \omega \quad (3, 4) \cup (4, \omega) \text{ دامنه}$$

$$y = \log_{x+3} x^2 - 1 \Rightarrow y = \log_{x+3} (x^2 - 1) \Rightarrow x > 1 \quad (x^2 - 1 > 0 \Rightarrow$$

$$x < -1 \Rightarrow x + 3 > 0 \Rightarrow x > -3 \quad x + 3 \neq 1 \Rightarrow x \neq -2$$

$$(-3, -2) \cup (-2, -1) \cup (1, +\infty) \text{ دامنه}$$

$$y = \log_{x-3} \frac{x^2 - 4x + 3}{x-3} = \frac{x^2 - 4x + 3}{x-3} > 0 \Rightarrow (x-1)(x-3)$$

$$x \neq 3 \Rightarrow (1, 3) \cup (3, +\infty) \text{ دامنه}$$

$$y = \log_{x+3} \frac{x+3}{x-2} = \frac{x+3}{x-2} > 0 \quad x+3=0 \Rightarrow x=-3 \text{ صورت}$$

$$x-2=0 \Rightarrow x=2 \text{ مخرج}$$

$$\Rightarrow x > 2 \quad x < -3 \Rightarrow x + \omega > 0 \Rightarrow x > -\omega$$

$$x + \omega \neq 1 \Rightarrow x \neq 1 - \omega \quad 0 < x < 2 \text{ و } (-\omega, -3) \cup (-3, -2) \cup (2, +\infty) \text{ دامنه}$$

$$y = \sqrt{x} - \log_p (x-2) = x-2 > 0 \Rightarrow x > 2 \quad \log_p (x-2) \leq 3$$

$$3 \geq \log_p (x+2) \quad 3 - \log_p (x-2) > 0 \quad x \leq \log_p (x-2) \leq p^3 = 1$$

$$2 < x \leq 10 \quad (2, 10] \text{ دامنه}$$

$$y = \log_2 (x \log_3 x - 1) = x > 0 \quad x > 3 = \sqrt{3} \log_3 x > \frac{1}{p} \quad 2 \log_3 x >$$

$$1 \quad 2 \log_3 x - 1 > 0 \quad x > \sqrt{3} \quad (\sqrt{3}, +\infty) \text{ دامنه}$$

$$y = \frac{3}{x^x - 1} \quad (x^x > 0 \quad y = \frac{3}{x^x + 1} \text{ اقل})$$

$$x=0 \quad x^x=1$$

$$x^x + 1 > 1 > 0 \text{ مخرج صفری نشود}$$

$$x^x - 1 = 0 \text{ مخرج صفری نشود} \quad (-\infty, +\infty) \subseteq \mathbb{R} \text{ دامنه}$$

$$x \in \log_2^3 \quad y = \frac{3}{x^x - p} \quad (-\infty, \frac{1}{p}) \cup (\frac{1}{p}, +\infty) \subseteq \mathbb{R} - \frac{1}{p} \text{ دامنه}$$

$$\log_2^3 = \frac{\log_2 3}{\log_2 2} = 3 \quad x^x - 3 = 0 \text{ مخرج صفری نشود}$$

$$(-\infty, \log_2^3) \cup (\log_2^3, +\infty) \subseteq \mathbb{R} - \log_2^3 \text{ دامنه} \Rightarrow \frac{\log_2 3}{2 \log_2 2} = \frac{1}{2} \quad x^x = 2 \quad x^x = 2 = 0$$

$$y = (x+1)! = x+1 > 0 \quad x+1 \in \mathbb{N} \cup \{0\}$$

$$x+1 \geq 0 \quad x \geq -1 \quad x \geq -\frac{1}{e} \quad [-\frac{1}{e}, +\infty) = \mathbb{D} \text{ دامنه}$$

$$y = \frac{(2x-2)!}{(2x-\omega)!} = 2x-2 > 0 \quad 2x-2 \in \mathbb{N} \cup \{0\}$$

$$2x-\omega \geq 0 \quad 2x-\omega \in \mathbb{N} \cup \{0\} \quad [3, +\infty) \text{ دامنه}$$

$$x-2 \geq 0 \rightarrow x \geq \frac{2}{3} \quad 2x-2 = n \rightarrow x = \frac{n+2}{2}$$