

الف) $y = \frac{\sin x - 2}{2 \cos x + 1} = \cos x = -\frac{1}{2} \cos x + 1 = 0$ مخرج

دامنه: $x = \frac{\pi}{3} + 2n\pi$ و $x = \frac{2\pi}{3} + 2n\pi$ $n \in \mathbb{Z}$ $R - \frac{\pi}{3} + 2n\pi$ $\frac{2\pi}{3} + 2n\pi$

ب) $y = \frac{\sin x + 3}{\cos x - 1} = \cos x = 1 \cos x - 1 = 0$ مخرج

دامنه: $x = 2n\pi$ $n \in \mathbb{Z}$ $R - 2n\pi$ $n \in \mathbb{Z}$

الف) $y = \frac{2 \sin x + 1}{\tan x + 1} = \tan x = -1 \tan x + 1 = 0$

دامنه: $x = -\frac{\pi}{4} + n\pi$ $\frac{\pi}{4} + n\pi$ $n \in \mathbb{Z}$

ب) $y = \frac{\cos x + 1}{\cot x - 1} = \cot x = 1 \cot x - 1 = 0$ $x = -\frac{\pi}{4} + n\pi$ $\frac{\pi}{4} + n\pi$ $n \in \mathbb{Z}$

الف) $\sin y = x^2 - 2 = -1 \leq \sin y \leq 1 \Rightarrow -1 \leq x^2 - 2 \leq 1 \Rightarrow 1 \leq x^2 \leq 3 \Rightarrow \sqrt{1} \leq x \leq \sqrt{3}$ $[-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $y = \arccos(\sqrt{x} - 3) = x - 3 \geq 0 \Rightarrow x \geq 3$ $-1 \leq \sqrt{x} - 3 \leq 1 \Rightarrow 4 \leq x \leq 16$

الف) $\cos y = |x| - 3 = -1 \leq \cos y \leq 1 \Rightarrow -1 \leq |x| - 3 \leq 1 \Rightarrow 2 \leq |x| \leq 4 \Rightarrow x \geq 2$ $[-4, -2] \cup [2, 4]$

ب) $y = \arcsin(x^2 + 3x + 1) = -\frac{\pi}{2} \leq x^2 + 3x + 1 \leq \frac{\pi}{2}$ $-2 \leq x \leq 0$ $x(x+3) \leq 0$ $x^2 + 3x + 1 \leq 0$ $x \geq -1$ $x \leq -2$ $(-2, 0) \cup (-1, 0)$

الف) $y = \log_2 x^2 - 4 = x^2 > 0 \Rightarrow x \neq 0$ $R - \{0\}$

ب) $y = \log_2 \frac{2-|x|}{2} = y \geq 1 - |x| \Rightarrow y \leq \log_2 2 - |x| = 1 - |x| \Rightarrow R - (-\infty, +\infty)$

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

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

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

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

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

$$(-3, -2) \cup (-2, -1) \cup (1, +\infty)$$

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

$$x \neq 3 \Rightarrow (1, 3) \cup (3, +\infty)$$

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

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

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

$$x + \omega \neq 1 \Rightarrow x \neq 1 - \omega \quad \text{و نه سببه}$$

$$(-\omega, -4) \cup (-4, -3) \cup (2, +\infty)$$

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

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

$$2 < x \leq 10 \quad (2, 10]$$

$$y = \log_2 (x \log_3 x - 1) = x > 0 \quad x > 3 = \sqrt{3} \log_3 x > \frac{1}{4} \quad x \log_3 x > \frac{1}{4}$$

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

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

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

$$x^x - 1 = 0 \quad \text{مخرج صفری شود}$$

$$x \neq \log_3 3 \quad y = \frac{3}{x^x - 3} \quad (x^x - 3 > 0) \quad (x^x - 3 < 0) \quad (x^x - 3 = 0)$$

$$\log_3 3 = \frac{\log_3 3}{\log_3 3} = 1 \quad x^x - 3 = 0 \quad \text{مخرج صفری شود}$$

$$(-\infty, \log_3 3) \cup (\log_3 3, +\infty) \quad (x^x - 3 > 0) \quad (x^x - 3 < 0) \quad (x^x - 3 = 0)$$

$$y = (x+1)! = x+1 > 0 \quad x+1 \in \mathbb{N} \cup \{0\} \quad (1, 2)$$

$$x+1 \geq 0 \quad x \geq -1 \quad x \geq -\frac{1}{e} \quad (-\frac{1}{e}, +\infty)$$

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

$$x - \omega \geq 0 \quad x - \omega \in \mathbb{N} \cup \{0\} \quad (x, +\infty)$$

$$x - 2 \geq 0 \Rightarrow x \geq \frac{2}{3} \quad x - 2 = n \Rightarrow x = (n+2)$$