

$$f(x) = \sqrt{(a-x)^2 - ax + b} \xrightarrow{a=4} \sqrt{x+4}$$

فدریب x باید صفر شود
معمولاً از حالت درجه ۲ خارج شود

$$\begin{aligned} a-x &= 0 \\ a &= 4 \end{aligned}$$

$$x+4=0 \xrightarrow{x=-4} x(4)+b=0$$

$$4+b=0$$

$$b = -4$$

$$f(x) = \sqrt{x^2 + 2x + 4 - m^2} > 0$$

$$(x+1)^2 + 1$$

$$(x+1)^2 + 1 - m^2 > 0$$

چون $(x+1)^2$ بیشترین مقدار زمانی است که $x = -1$ باشد

$$1 - m^2 > 0 \rightarrow m^2 \leq 1$$

$$-1 \leq m \leq 1$$

$$m_{\max} - m_{\min} = 1 - (-1) = 2$$

$$f(x) = \frac{5x - x^2}{[x] + [-x] + 1} \rightarrow \begin{aligned} 5 - x^2 &> 0 \\ x^2 &\leq 5 \\ -2 \leq x \leq 2 \end{aligned} \quad (1)$$

$$[x] + [-x] + 1 \neq 0$$

$$[x] + [-x] \neq -1 \rightarrow x \notin \mathbb{Z}$$

$$(2) \quad x \in \mathbb{Z} \text{ باید صفر نشود}$$

$$(1) \cap (2) \rightarrow [-2, 2]$$

$$-2, -1, 0, 1, 2$$

$$\boxed{-2}$$

$$f(x) = \sqrt{x^3 + 3x^2} > 0 \rightarrow x^2(x+3) > 0 \rightarrow \begin{aligned} -3 & \quad 0 \quad 3 \\ - & + & + \end{aligned} \quad D_f = [-3, +\infty)$$

$$y = \sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}} > 0 \rightarrow \frac{(x-1)(x+1)x^2(x-3)}{(x-1)(x^2+x+1)} > 0 \rightarrow \frac{(x+1)(x-3)x^2}{(x^2+x+1)} > 0$$

$$\begin{aligned} -1 & \quad 0 \quad 3 \\ + & - & - & + \end{aligned} \quad D_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$$

$$f(x) = \sqrt{|x-2|-3} > 0 \rightarrow |x-2|-3 > 0 \rightarrow |x-2| > 3 \rightarrow \begin{aligned} x-2 &> 3 \rightarrow x > 5 \\ x-2 &\leq -3 \rightarrow x \leq -1 \end{aligned}$$

$$D_f = (-\infty, -1] \cup [5, +\infty)$$

$$y = \sqrt{8-12-x} > 0 \rightarrow 8-12-x > 0 \rightarrow |2-x| \leq 4 \rightarrow \begin{aligned} -4 &\leq 2-x \leq 4 \\ -4 &\leq -x \leq 2 \\ -4 &\leq x \leq 2 \end{aligned}$$

$$D_f = [-4, 2]$$

$$y = \sqrt{1-x|x|} > 0 \rightarrow 1-x|x| > 0 \xrightarrow{|x|=x} 1-x^2 > 0 \rightarrow x^2 < 1 \rightarrow -1 < x < 1$$

$$\xrightarrow{|x|=-x} 1+x^2 > 0 \rightarrow x^2 > -1$$

$$D_f = (-\infty, 1]$$

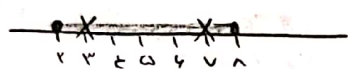
$$y = \frac{1}{\sqrt{x-|x-1|-1}}$$

$$① x-|x-1| > 0 \rightarrow |x-1| < x \rightarrow -x \leq x-1 \leq x \rightarrow \boxed{1 \leq x \leq 1}$$

$$② \sqrt{x-|x-1|-1} \neq 0 \rightarrow \sqrt{x-|x-1|-1} \neq 1 \rightarrow x-|x-1| \neq 1$$

$$\rightarrow |x-1| \neq x \rightarrow x-1 \neq x \rightarrow \boxed{x \neq 1}$$

$$\rightarrow 1-x \neq x \rightarrow \boxed{x \neq \frac{1}{2}}$$



$$\rightarrow D_f = [1/2, 1] - \{1/2, 1\}$$

$$D_f = [1/2, 1) \cup (1/2, 1]$$

$$y = \frac{\sin^2 x - 1}{\cos x} \rightarrow \cos x \neq 0$$

$$\cos x \neq k\pi + \frac{\pi}{2}$$

$$D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$$



$$y = \frac{\cos x}{x \cos x - 1} \rightarrow x \cos x \neq 1 \rightarrow \cos x \neq \frac{1}{x}$$

$$\begin{cases} \cos x \neq k\pi + \frac{\pi}{2} \\ \cos x \neq k\pi - \frac{\pi}{2} \end{cases}$$



$$D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{2}\}$$

$$y = \frac{x+x}{|x+1|-|x+x|} \rightarrow |x+1|-|x+x| \neq 0 \rightarrow |x+1| \neq |x+x|$$

$$(x+1)^x \neq (x+x)^x$$

$$(x+1)^x - (x+x)^x \neq 0$$

$$((x+1)-(x+x))((x+1)+(x+x)) \neq 0$$

$$(x-x)(x+x) \neq 0 \rightarrow D_f = \mathbb{R} - \{-\frac{x}{x}, x\}$$

$$y = \sqrt{|x+1|-|x+x|} > 0$$

$$|x+1| > |x+x|$$

$$(x+1)^x > (x+x)^x$$

$$(x+1)^x - (x+x)^x > 0$$

$$((x+1)-(x+x))((x+1)+(x+x)) > 0$$

$$(x-x)(x+x) > 0$$

$$x \rightarrow -\frac{x}{x}$$

$$\frac{-\frac{x}{x}}{x} = -\frac{1}{x}$$

$$D_f = (-\infty, -\frac{1}{x}] \cup [x, +\infty)$$

$$f(x) = \int \log \log \log (x-1)$$

$$\frac{1}{x} \rightarrow \text{بين صفر و واحد} \xrightarrow{\text{cos}} 0 < \log_{\omega} (x-1) \leq 0$$

$$0 < \log_{\omega} (x-1)$$

$$(x-1) \mid$$

$$\textcircled{1} \mid x > 1$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow 1 < x \leq \omega$$

$$D_f = (1, \omega]$$

$$\log_{\omega} (x-1) \leq 1$$

$$x-1 \leq \omega$$

$$\textcircled{2} x \leq \omega$$

$$\text{الف) } y = \log(x \cos x + 1) \rightarrow x \cos x + 1 > 0 \rightarrow \cos x > -\frac{1}{x} \quad \text{لو}$$

$$D_f = \mathbb{R} - \left[x\mu\pi + \frac{x\pi}{x}, x\mu\pi + \frac{x\pi}{x} \right]$$

$$\text{ب) } y = \int \log \frac{x-1}{x+1} \rightarrow \textcircled{1} \frac{x-1}{x+1} > 0 \rightarrow \frac{-1}{+} = - \rightarrow (-\infty, -1) \cup (1, +\infty)$$

$$\textcircled{2} \log \frac{x-1}{x+1} > 0 \rightarrow \frac{x-1}{x+1} > 1 \rightarrow \frac{x-1}{x+1} - 1 > 0 \rightarrow \frac{x-1-x-1}{x+1} > 0$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow D_f = (-\infty, -1) \cup (1, +\infty)$$