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$$f(n) = \sqrt{(a-x)n^2 + an + b}$$

$$D_f = (3, +\infty)$$

$$b = ?$$

چون انتگرال دارد پس باید به صورت معادله خط باشد پس:

$$a-x=0 \Rightarrow \boxed{a=x}$$

$$f(n) = \sqrt{2n+b} \xrightarrow{n=3} 2 \times 3 + b = 0 \Rightarrow \boxed{b=-6}$$

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$$f(n) = \sqrt{x^2 + 2x + 2 - m^2}$$

$$D_f = \mathbb{R}$$

د کمترین مقدار - بیشترین مقدار m ؟

سطح انحنای معادله درجه ۲ دارای ۲ نقطه تقاطع است پس این است که ضریب x^2 مثبت و $\Delta \leq 0$ باشد پس:

$$\Delta = 4 - 4(1)(2-m^2) \leq 0 \Rightarrow 4 - 4 + 4m^2 \leq 0 \Rightarrow 4m^2 - 4 \leq 0 \Rightarrow m^2 - 1 \leq 0 \Rightarrow \boxed{m^2 \leq 1}$$

$$\frac{m^2}{1} = 1 \quad \text{و} \quad \frac{m^2}{-1} = -1 \Rightarrow 1 - (-1) = 2$$

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$$f(n) = \frac{4 - x^2}{[n] + [-n] + 1}$$

$$\rightarrow \begin{cases} \text{I} \quad 4 - x^2 > 0 & \frac{4}{-1} \quad D_f = [-2, 2] \\ \text{II} \quad [n] + [-n] + 1 \neq 0 \Rightarrow [n] + [-n] + 1 \neq 0 \end{cases}$$

$$\begin{cases} 0 \in \mathbb{Z} \\ -1 \notin \mathbb{Z} \end{cases}$$

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

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$$f(x) = \sqrt{x^2 + 3x^2}$$

$$\Rightarrow x^2 + 3x^2 > 0 \Rightarrow x^2(1+3) > 0 \Rightarrow x^2 > 0 \Rightarrow x \neq 0$$

$$\frac{4}{-1} \quad D_f = [-3, +\infty)$$

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

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

$$\frac{4}{-1} \quad D_f = (-\infty, 0] \cup [3, +\infty)$$

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$$f(x) = \sqrt{|x-1|-3}$$

$$\Rightarrow |x-1|-3 > 0 \Rightarrow \begin{cases} \text{I} \quad \text{if } (x > 0) \Rightarrow x-1 > 3 \Rightarrow x > 4 \\ \text{II} \quad \text{if } (x < 0) \Rightarrow -x-1 > 3 \Rightarrow x < -4 \end{cases}$$

$$\text{I} \cup \text{II} \Rightarrow D_f = (-\infty, -4] \cup [4, +\infty)$$

$$f(x) = \sqrt{4-|x-2|}$$

$$\Rightarrow 4-|x-2| > 0 \Rightarrow \begin{cases} \text{I} \quad \text{if } (x > 0) \Rightarrow 4-x > 0 \Rightarrow x < 4 \\ \text{II} \quad \text{if } (x < 0) \Rightarrow 4-x > 0 \Rightarrow x < 4 \end{cases}$$

$$\text{I} \cap \text{II} \Rightarrow D_f = [-2, 4]$$

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$$f(x) = \sqrt{1-|x|}$$

$$\Rightarrow 1-|x| > 0 \Rightarrow \begin{cases} \text{I} \quad \text{if } (x > 0) \Rightarrow 1-x > 0 \Rightarrow x < 1 \\ \text{II} \quad \text{if } (x < 0) \Rightarrow 1+x > 0 \Rightarrow x > -1 \end{cases}$$

$$\frac{4}{-1} \quad D_f = [-1, 1]$$

$$f(x) = \frac{1}{\sqrt{4-|x-3|}}$$

$$\Rightarrow 4-|x-3| > 0 \Rightarrow \begin{cases} \text{I} \quad \text{if } (x > 0) \Rightarrow 4-x > 0 \Rightarrow x < 4 \\ \text{II} \quad \text{if } (x < 0) \Rightarrow x-3 > 0 \Rightarrow x > 3 \end{cases}$$

$$\text{I} \cap \text{II} \Rightarrow D_f = (3, 4) \subseteq D_f = \mathbb{R} - [-\infty, 3] \cup [4, +\infty)$$

$$\text{الف) } y = \frac{\sin 2x - 1}{\cos x} \rightarrow \cos x \neq 0 \quad \odot \quad D_f = \mathbb{R} - \left\{ \frac{k\pi}{2} \right\}$$

$$\text{ب) } y = \frac{\cos x}{2\cos x - 1} \rightarrow 2\cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{2} \quad \odot \quad D_f = \mathbb{R} - \left\{ 2k\pi \pm \frac{\pi}{3} \right\}$$

$$D_f = \mathbb{R} - \left\{ 2k\pi - \frac{\pi}{3}, 2k\pi + \frac{\pi}{3} \right\}$$

$$\text{الف) } y = \frac{x+3}{|x+1| - |x+3|} \rightarrow (x+1)^2 = (x+3)^2 \rightarrow x^2 + 1 + 2x = x^2 + 9 + 6x \rightarrow x^2 - 2x - 1 = 0$$

$$\Delta = 4 - 4(-1) = 8 \Rightarrow x_1 = \frac{2 + \sqrt{8}}{2} = 1 + \sqrt{2} \Rightarrow D_f = \mathbb{R} - \left\{ -\frac{5}{4}, 1 \right\}$$

$$x_2 = \frac{2 - \sqrt{8}}{2} = 1 - \sqrt{2} = -\frac{1}{4} = -\frac{1}{4}$$

$$\text{ب) } y = \sqrt{|x+1| - |x+3|} \Rightarrow |x+1| \geq |x+3| \rightarrow (x+1)^2 \geq (x+3)^2 \rightarrow x^2 + 2x + 1 \geq x^2 + 6x + 9$$

$$-4x - 8 \geq 0 \Rightarrow x \leq -2$$

$$D_f = (-\infty, -2] \cup [1, +\infty)$$

$$f(x) = \sqrt{\log_{\frac{1}{\omega}} (x-1)} \quad \frac{1}{r} < 1 \rightarrow \log_{\frac{1}{r}} a \geq 0 \Rightarrow 0 < \log_{\frac{1}{\omega}} (x-1) \leq 1 \rightarrow 1 < x-1 \leq \omega$$

$$\rightarrow 1 < x \leq \omega + 1 \Rightarrow D_f = (1, \omega + 1]$$

$$\text{الف) } y = \log_2 (2\cos x + 1) \rightarrow 2\cos x + 1 > 0 \rightarrow \cos x > -\frac{1}{2} \quad \odot \quad D_f = \left(2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3} \right)$$

$$\text{ب) } y = \sqrt{\log_{\frac{x-1}{x+1}} \frac{x-1}{x+1}} \rightarrow \frac{x-1}{x+1} > 0 \rightarrow \frac{x-1}{x+1} > 1 \Rightarrow D_f = (-\infty, -1) \cup (1, \infty)$$

$$\text{II} \rightarrow D_f = (-\infty, -1)$$

$$\log_{\frac{x-1}{x+1}} \frac{x-1}{x+1} \geq 0 \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow \frac{(x-1) - (x+1)}{x+1} \geq 0 \Rightarrow \frac{-2}{x+1} \geq 0 \Rightarrow x < -1$$