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$$f(x) = \sqrt{(a-x)x^2 + ax + b} \quad D_f = [1, \infty)$$

خطی $\Rightarrow a-x \geq 0 \quad a \geq x$

$$f(x) = \sqrt{x^2 + b} \quad x^2 + b \geq 0$$

$$x \geq 1 \Rightarrow 1 + b \geq 0 \quad \boxed{b \geq -1}$$

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$$f(x) = \sqrt{x^2 + 2x + 2 - m^2} \quad D_f = \mathbb{R}$$

$$x^2 + 2x + 2 - m^2 \geq 0$$

$$\Delta \leq 0 \Rightarrow 4 - 4 + 4m^2 \leq 0 \Rightarrow m^2 \leq 1 \Rightarrow -1 \leq m \leq 1$$

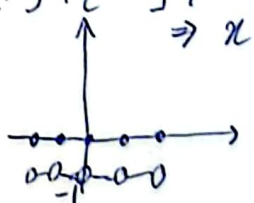
ملاحظه: $1 - (-1) = 2$

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

$$4-x^2 \geq 0 \quad x^2 \leq 4 \Rightarrow -2 \leq x \leq 2$$

$$[x] + [-x] + 1 \neq 0 \quad [x] + [-x] \neq -1 \Rightarrow x \in \mathbb{Z}$$

$$D_f = \{-2, -1, 0, 1, 2\} \Rightarrow \text{مجموعه صحیح}$$


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$$الف) y = \sqrt{x^3 + 3x^2} \quad x^3 + 3x^2 \geq 0 \Rightarrow x^2(x+3) \geq 0 \Rightarrow x \geq -3 \quad D_f = [-3, \infty)$$

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

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

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

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$$الف) y = \sqrt{|x-2| - 3} \quad |x-2| - 3 \geq 0 \Rightarrow |x-2| \geq 3$$

$$x-2 \geq 3 \Rightarrow x \geq 5$$

$$x-2 \leq -3 \Rightarrow x \leq -1$$

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

$$\Rightarrow y = \sqrt{4 - |2-x|} \quad 4 - |2-x| \geq 0 \quad |2-x| \leq 4$$

$$-4 \leq 2-x \leq 4$$

$$-4 \leq -x \leq 2$$

$$-2 \leq x \leq 4 \quad D_f = [-2, 4]$$

$$\text{الف) } y = \sqrt{1-x|x|}$$

$$1-x|x| \geq 0$$

$$x|x| \leq 1 \Rightarrow D_f = (-\infty, 1]$$

$$\text{ب) } y = \frac{1}{\sqrt{3-|x-\delta|}-1}$$

$$3-|x-\delta| \geq 0 \quad |x-\delta| \leq 3 \quad -3 \leq x-\delta \leq 3$$

$$2 \leq x \leq 4$$

$$\sqrt{3-|x-\delta|}-1 \neq 0 \quad \sqrt{3-|x-\delta|} \neq 1 \quad 3-|x-\delta| \neq 1$$

$$D_f = (2, 3) \cup (3, 4) \cup (4, 1]$$

$$|x-\delta| \neq 2$$

$$x-\delta \neq 2$$

$$x \neq 4$$

$$\text{الف) } y = \frac{\sin^2 x - 1}{\cos x}$$

$$\cos x \neq 0$$

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



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$$\text{ب) } y = \frac{\cos x}{x \cos x - 1}$$

$$x \cos x - 1 \neq 0$$

$$x \cos x \neq 1 \Rightarrow \cos x \neq \frac{1}{x}$$



$$D_f = \mathbb{R} - \left\{x \mid x \cos x = 1\right\}$$

$$\text{الف) } y = \frac{x+3}{|x+1| - |x+3|}$$

$$|x+1| - |x+3| \neq 0$$

$$|x+1| \neq |x+3| \Rightarrow x+1 \neq x+3$$

$$x \neq 1$$

$$x+1 \neq -(x+3)$$

$$2x \neq -4 \quad x \neq -2$$

$$D_f = \mathbb{R} - \left\{-\frac{4}{3}, 1\right\}$$

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$$\text{ب) } y = \sqrt{|x+1| - |x+3|}$$

$$|x+1| - |x+3| \geq 0$$

$$|x+1| \geq |x+3| \Rightarrow x^2+2x+1 \geq x^2+6x+9$$

$$x^2-4x-8 \geq 0$$

$$x \leq \frac{4-\sqrt{100}}{2} \quad x \geq \frac{4+\sqrt{100}}{2}$$

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

$$f(x) = \sqrt{\log_{\log_{\frac{1}{2}} \delta} (x-1)}$$

$$x-1 > 0 \quad x > 1$$

$$\log_{\frac{1}{2}} (x-1) > 0 \quad x-1 > 1 \quad x > 2$$

$$\log_{\log_{\frac{1}{2}} \delta} (x-1) > 0 \Rightarrow \log_{\frac{1}{2}} (x-1) \leq 1 \Rightarrow x-1 \leq 2$$

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$$D_f = (1, 3]$$

$$\text{الف) } y = \log(x \cos x + 1)$$

$$x \cos x + 1 > 0$$

$$\cos x > -\frac{1}{x}$$



$$D_f = \left(x \mid x \cos x > -\frac{1}{x}\right)$$

$$\text{ب) } y = \sqrt{\log \frac{x-1}{x+1}}$$

$$\frac{x-1}{x+1} > 0 \quad \frac{-1}{x+1} > 0$$

$$\log \frac{x-1}{x+1} > 0 \quad \frac{x-1}{x+1} > 1$$

$$\frac{x-1}{x+1} - 1 > 0$$

$$\frac{x-1-x-1}{x+1} > 0$$

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$$\Rightarrow x+1 < 0 \Rightarrow x < -1 \quad D_f = (-\infty, -1)$$