

$$f_{(n)} = \sqrt{(a-r)x^r + a + b} \quad [r, +\infty)$$

$$a = r \quad r + b \geq 0$$

$$x = r^0 \rightarrow a + b = 0 \rightarrow b = -r$$

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$$f_{(n)} = \sqrt{x^r + r + r - m^r} \quad D_f = \mathbb{R}$$

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

$$\Delta \leq 0 \rightarrow r^r - r(r - m^r) = r^r - r + r m^r = r m^r - r \leq 0 \rightarrow m^r \leq 1 \rightarrow -1 \leq m \leq 1$$

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

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$$f_{(n)} = \frac{\sqrt{t - n^r}}{[n] + [-n] + 1}$$

$$t - n^r \geq 0 \rightarrow t \geq n^r \rightarrow -r \leq n \leq r \quad (1)$$

$$(1) \cap (2) \rightarrow \{-r, -1, 0, 1, r\}$$

مجموع

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$$[n] + [-n] = -1 \rightarrow n \notin \mathbb{Z}$$

$$[n] + [n] \neq -1 \rightarrow n \in \mathbb{Z} \quad (2)$$

$$\text{الف) } y = \sqrt{x^r + r x^r}$$

$$D_f = [-r, +\infty)$$

$$x^r + r x^r \geq 0 \rightarrow x^r (x + r) \geq 0 \quad \frac{-r}{-1 + \phi +}$$

$$\text{ب) } y = \sqrt{\frac{(x^r - 1)(x^r - r x^r)}{x^r - 1}} \geq 0$$

$$x^r \neq 1 \rightarrow x \neq 1$$

$$(x^r - 1)(x^r - r x^r) = (x - 1)(x + 1) x^r (x - r)$$

$$\frac{x^r (x - 1)(x + 1)(x - r)}{(x - 1)(x^r + x + 1)} \rightarrow \Delta \leq 0$$

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

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$$\text{الف) } y = \sqrt{|x - r| - r^3}$$

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

$$|x - r| \geq r^3 \begin{cases} \rightarrow x - r \geq r^3 & x \geq r + r^3 \\ \rightarrow x - r \leq -r^3 & x \leq r - r^3 \end{cases}$$

$$\text{ب) } y = \sqrt{t - |r - x|}$$

$$D_f = [-r, r]$$

$$t \geq |r - x| \begin{cases} \rightarrow t \geq r - x & x \geq r - t \\ \rightarrow -t \leq r - x & x \leq r + t \end{cases}$$

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$$\text{الف) } \sqrt{1-x|n|}$$

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

$$1-x|n| \geq 0 \rightarrow \begin{cases} x \geq 0 \rightarrow 1-x^2 \geq 0 \rightarrow x^2 \leq 1 \rightarrow -1 \leq x \leq 1 \\ x < 0 \rightarrow 1-x(-x) \geq 0 \rightarrow 1+x^2 \geq 0 \rightarrow x > 0 \end{cases}$$

$$\Rightarrow \frac{1}{\sqrt{1-x|n|-1}}$$

$$1-x|n|-1 \geq 0, x \neq 1$$

$$\rightarrow |x-n| \leq 1 \rightarrow -1 \leq x-n \leq 1 \rightarrow 1 \leq x \leq 1$$

$$D_f = [1, 1] - \{1\} = \emptyset$$

$$1-x|n|-1 \neq 0 \rightarrow x \neq 1$$

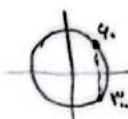
$$\text{الف) } y = \frac{\sin^n x - 1}{\cos x}$$

$$\cos x \neq 0 \rightarrow D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{2}, k\pi + \frac{3\pi}{2} \right\}$$



$$\Rightarrow y = \frac{\cos x}{1 - \cos x}$$

$$1 - \cos x \neq 0 \rightarrow \cos x \neq 1 \rightarrow x \neq 2k\pi$$



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

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

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

$$\begin{cases} 1+x+1-|x+1| \neq 0 \rightarrow \begin{cases} x+1 \geq 0 \rightarrow x+1=|x+1| \rightarrow x+1-x-1=0 \rightarrow x \neq -1 \\ x+1 < 0 \rightarrow x+1=-|x+1| \rightarrow x+1+x+1=0 \rightarrow x \neq -1 \end{cases} \end{cases}$$

$$D_f = \mathbb{R} - \{-1\}$$

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

$$x \geq -1 \rightarrow x \leq -\frac{1}{2}$$

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

$$\begin{aligned} & \rightarrow (1+x+1)^2 \geq (x+1)^2 \rightarrow 1+x+1 \geq x+1 \rightarrow x \geq -1 \\ & \rightarrow 1+x+1-|x+1| \geq 0 \rightarrow \Delta = (1+x+1)^2 - (x+1)^2 = 4(x+1) \geq 0 \rightarrow x \geq -1 \end{aligned}$$

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

$$f(x) = \sqrt{\log_{10} \log_{10} (x-1)}$$

$$x-1 > 0 \rightarrow x > 1 \rightarrow x > \frac{1}{10} \text{ ①}$$

$$\log_{10} (x-1) > 1 \rightarrow x-1 > 10 \rightarrow x > 11 \text{ ②}$$

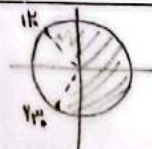
$$\text{①} \cap \text{②} = (11, +\infty)$$

$$\text{الف) } \log (\cos x + 1)$$

$$\cos x + 1 > 0$$

$$\cos x > -1$$

$$\cos x > -\frac{1}{2}$$



$$D_f = (2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3})$$

$$\Rightarrow y = \sqrt{\log \frac{x-1}{x+1}}$$

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

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

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