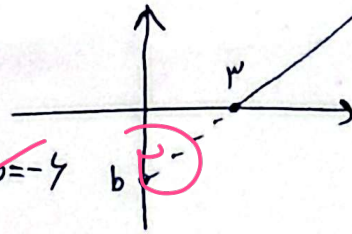


$$f(n) = \sqrt{(a-2)n^2 + an + b}$$

$$\Rightarrow a=2 \Rightarrow 2n+b \Rightarrow 4+b=0 \Rightarrow b=-4$$



-1

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

همواره مثبت

$$f - 1 + m^2 \leq 0 \Rightarrow f m^2 \leq f \Rightarrow -1 \leq m \leq 1$$

$$1 - (-1) = 2$$

-2

$$f(n) = \sqrt{4 - n^2}$$

$$f \geq n^2 \Rightarrow 2 \geq n \geq -2$$

-3

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

$$\Rightarrow -2, -1, 0, 1, 2$$

اعداد صحیح

$$\text{الف) } y = \sqrt{n^3 + 3n^2} \Rightarrow n^2 + 3n^2 \geq 0 \Rightarrow n^2(n+3) \geq 0$$

$$Df = [-3, +\infty)$$

$$\text{ب) } y = \sqrt{\frac{(n^2-1)(n^3-3n^2)}{n^3-1}}$$

$$n^2-1 \neq 0 \Rightarrow n \neq 1$$

$$n^2-1 = (n-1)(n+1)$$

$$n^3-3n^2 = n^2(n-3)$$

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

$$\text{الف) } y = \sqrt{|x-2|-3} \Rightarrow \begin{cases} x-2 \geq 0 \Rightarrow x \geq 2 \\ -x-1 \geq 0 \Rightarrow x \leq -1 \end{cases} \Rightarrow Df = (-\infty, -1] \cup [2, +\infty)$$

$$\text{ب) } y = \sqrt{4-(2-x)} \Rightarrow \begin{cases} 2+x \geq 0 \Rightarrow x \geq -2 \\ 4-x \geq 0 \Rightarrow x \leq 4 \end{cases} \Rightarrow Df = [-2, 4]$$

$$\text{الف) } y = \sqrt{1-n|n|} \Rightarrow \begin{cases} n \geq 0 \Rightarrow 1-n^2 \geq 0 \Rightarrow 1 \geq n^2 \Rightarrow 1 \geq n \geq -1 \\ n < 0 \Rightarrow 1+n^2 \geq 0 \Rightarrow n^2 \geq -1 \Rightarrow Df = (-\infty, 1] \end{cases}$$

همواره برقرار است

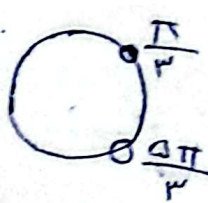
$$\text{ب) } y = \frac{1}{\sqrt{3-|n-2|-1}}$$

$$\begin{cases} 1-n \geq 0 \Rightarrow 1 \geq n \\ n-2 \geq 0 \Rightarrow n \geq 2 \end{cases} \Rightarrow Df = (2, 1) - \{3\} \cup \{7\}$$

به زیر رادیکال منفی است!

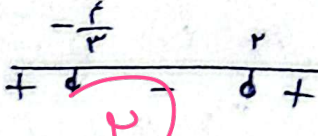
$$[2, 1] - \{3, 7\}$$

الف) $y = \frac{\sin^2 x - 1}{\cos x} \Rightarrow \cos x \neq 0$  $D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{2} \right\}$

ب) $y = \frac{\cos x}{r \cos x - 1} \Rightarrow \cos x \neq +\frac{1}{r}$  $\Rightarrow D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{r} \right\} - \left\{ 2k\pi - \frac{\pi}{r} \right\}$

الف) $y = \frac{x+r}{|2x+1| - |x+r|} \Rightarrow |2x+1| \neq |x+r| \xrightarrow{\text{مربع الطرفين}} x^2 + 2x + 1 \neq x^2 + 2rx + r^2$

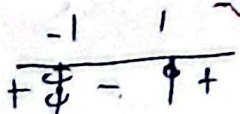
$\Rightarrow x^2 - 2x - 1 \neq 0 \Rightarrow (x+r)(x-r) \neq 0 \Rightarrow D_f = \mathbb{R} - \left\{ r \right\} - \left\{ -\frac{r}{2} \right\}$

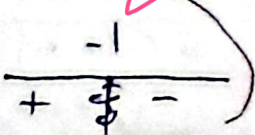
ب) $y = \sqrt{|2x+1| - |x+r|} \Rightarrow |2x+1| \geq |x+r| \xrightarrow{\text{مربع الطرفين}} x^2 + 2x + 1 \geq x^2 + 2rx + r^2$
 $\Rightarrow x^2 - 2x - 1 \geq 0 \Rightarrow (x+r)(x-r) \geq 0$
 $\Rightarrow D_f = (-\infty, -\frac{r}{2}] \cup [r, +\infty)$ 

$f(x) = \sqrt{\log_{\log_{10}}(rx-1)}$ $\begin{cases} rx > \frac{1}{r} \\ \log_{\log_{10}}(rx-1) > 0 \Rightarrow rx-1 > 1 \Rightarrow rx > 2 \Rightarrow x > \frac{2}{r} \\ \log_{\log_{10}}(rx-1) > 0 \Rightarrow \log_{10}(rx-1) \leq 1 \Rightarrow rx-1 \leq 10 \Rightarrow x \leq \frac{11}{r} \end{cases}$

$D_f = (1, 3]$ 

الف) $y = \log(r \cos x + 1) \Rightarrow r \cos x + 1 > 0 \Rightarrow \cos x > -\frac{1}{r}$  $\Rightarrow D_f = \mathbb{R} - \left[2k\pi + \frac{\pi}{r}, 2k\pi + \frac{\pi}{r} \right]$

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

$\log \frac{x-1}{x+1} \geq 0 \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow \frac{x-1}{x+1} - 1 \geq 0 \Rightarrow \frac{-2}{x+1} \geq 0$ 

$$4- \text{ب} \quad 3 - |n-5| \geq 0 \rightarrow |n-5| \leq 3 \rightarrow -3 \leq n-5 \leq 3 \rightarrow 2 \leq n \leq 8$$

$$\sqrt{3 - |n-5|} - 1 \neq 0 \rightarrow \sqrt{3 - |n-5|} \neq 1 \rightarrow 3 - |n-5| \neq 2 \rightarrow |n-5| \neq 2 \rightarrow n \neq 3, 7$$

$$D_f = [2, 8] - \{3, 7\} = [2, 3) \cup (3, 7) \cup (7, 8]$$