

الف) $y = \frac{x+3}{2x^3+2x^2-11x+3} \Rightarrow$ ریشه یابی: $(x-1)(2x^2-9x-3)=0 \rightarrow (x-1)(x+3)(2x-1)$
 $D_f = \mathbb{R} - \{-3, 1, \frac{1}{2}\}$ ✓

ب) $y = \frac{x+3}{2x^3+9x^2+10x+3} \Rightarrow$ ریشه یابی: $(x+1)(2x^2+7x+3)=0 \rightarrow (x+1)(2x+1)(x+3)=0$
 $D_f = \mathbb{R} - \{-3, -1, -\frac{1}{2}\}$ ✓

الف) $y = \frac{x+3}{x^3-2x^2+2x-1} \Rightarrow$ ریشه یابی: $(x^3-x^2)+(-x^2+x)+(x-1) \rightarrow x^2(x-1)-x(x-1)+(x-1)$
 $\rightarrow (x-1)(x^2-x+1)=0$
 $\downarrow \Delta < 0$
 $x=1$
 $D_f = \mathbb{R} - \{1\}$

ب) $y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} \rightarrow \frac{(x+3)}{(x-1)(x^2-x+1)} \geq 0$
 $\downarrow \Delta < 0$
 $D_f = \mathbb{R} - (-3, 1] \cup (-\infty, -3] \cup (1, +\infty)$ ✓

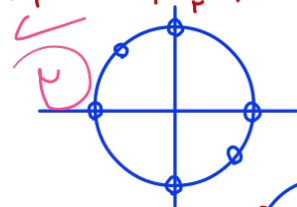
$y = \frac{2}{x^2-5|x-1|-2x+5} \Rightarrow \begin{cases} x \leq 1 \rightarrow x^2+3x=0 \rightarrow x=0 \text{ یا } x=-3 \\ x \geq 1 \rightarrow x^2-7x+10=0 \rightarrow x=5 \text{ یا } x=2 \end{cases}$
 $D_f = \mathbb{R} - \{-3, 0, 2, 5\}$ ✓

الف) $y = \sqrt{[-x]-2} \rightarrow [-x]-2 \geq 0 \rightarrow [-x] \geq 2 \rightarrow x \leq -2$
 $D_f = (-\infty, -2]$ ✓

ب) $y = \frac{5x^2+4}{[x]^2-2[x]-3} \rightarrow$ ریشه یابی: $[x]^2-2[x]-3=0 \rightarrow ([x]-3)([x]+1)=0$
 $[x]=3 \rightarrow [x]=2$
 $[x]=-1 \rightarrow [x]=-1$
 $D_{f_r} = (-\infty, -1) \cup [0, 3) \cup [4, +\infty)$
 $D_{f_i} = [3, 4) \cup [-1, 0)$

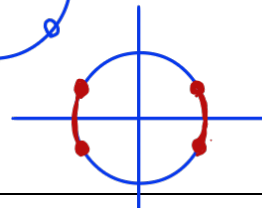
الف) $y = \sqrt{[x-\frac{1}{2}]+[x+\frac{1}{2}]} \rightarrow [x-\frac{1}{2}]+[x+\frac{1}{2}] \geq 0$ جمع و منفی کردن در نامعادله
 $[x-\frac{1}{2}+1]+[x+\frac{1}{2}]-1 \geq 0 \rightarrow 2[x+\frac{1}{2}]-1 \geq 0 \rightarrow [x+\frac{1}{2}] \geq \frac{1}{2}$
 $\rightarrow x+\frac{1}{2} \geq 1 \rightarrow x \geq \frac{1}{2}$
 $D_f = [\frac{1}{2}, +\infty)$
 ب) $y = \sqrt{[x-\frac{1}{2}]+[\frac{1}{2}-x]} \rightarrow [x-\frac{1}{2}]+[\frac{1}{2}-x]$
 if $x-\frac{1}{2}=t \rightarrow \sqrt{[t]+[-t]} \geq 0 \rightarrow t \in \mathbb{Z} \rightarrow x-\frac{1}{2} \in \mathbb{Z}$
 $D_f = \{x = k + \frac{1}{2} \mid k \in \mathbb{Z}\}$
 $x \in \mathbb{Z} + \frac{1}{2}$

الف) $y = \frac{\cot x + 1}{\tan x + 1} \rightarrow \frac{k\pi}{\pi} \text{ مقدار } \cot, \tan$
 تقریب نشده اند
 $k\pi - \frac{\pi}{4} \text{ مقدار } \tan \neq -1$
 $D_f = \mathbb{R} - \{k\pi, k\pi - \frac{\pi}{4}\}$

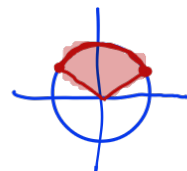


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ب) $y = \sqrt{1 - 4\sin^2 x} \rightarrow 1 - 4\sin^2 x \geq 0 \rightarrow \frac{1}{4} \geq \sin^2 x$
 $-\frac{1}{2} \leq \sin x \leq \frac{1}{2}$
 $x \in [k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4}]$

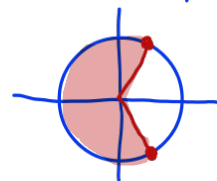


الف) $y = \sqrt{2\sin x - 1} \rightarrow 2\sin x - 1 \geq 0 \rightarrow 2\sin x \geq 1 \rightarrow \sin x \geq \frac{1}{2}$
 $x \in [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$

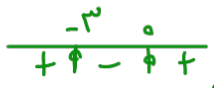


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ب) $y = \sqrt{1 - 2\cos x} \rightarrow 1 - 2\cos x \geq 0 \rightarrow \frac{1}{2} \geq \cos x$
 $x \in [2k\pi + \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3}]$



الف) $y = \arcsin(x^2 + 3x + 1) \rightarrow -1 \leq x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0$
 $x \in [-3, 0]$
 $x \in [-3, -1] \cup [-1, 0]$
 $x \in [-3, 0]$



ب) $\cos y = \sqrt{5 - 2x} \rightarrow -1 \leq \sqrt{5 - 2x} \leq 1$

$5 - 2x \geq 0 \rightarrow 5 \geq 2x \rightarrow x \leq \frac{5}{2}$
 $\sqrt{5 - 2x} \leq 1 \rightarrow 5 - 2x \leq 1 \rightarrow 4 \leq 2x \rightarrow 2 \leq x$
 $D_f = [2, \frac{5}{2}]$

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الف) $y = \log_2(1 - \log_2 x) \rightarrow 1 - \log_2 x > 0 \rightarrow 1 > \log_2 x \rightarrow x < 2$
 $x > 0$
 $x \in (0, 2)$

جواب نهایی

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ب) $y = \log_2(1 - \log_2 \frac{x}{4}) \rightarrow 1 - \log_2 \frac{x}{4} > 0 \rightarrow 1 > \log_2 \frac{x}{4} \rightarrow \log_2 \frac{x}{4} < 1 \rightarrow x < 8$
 $x > 0$
 $D_f = (\frac{1}{4}, +\infty)$

چون مقدار نامعادله بین ۰ و ۱ است پس جهت نامعادله را تغییر می دهیم

الف) $y = \sqrt{2^{2n} - n^2} - 1 \rightarrow 2^{2n} - n^2 \geq 0 \rightarrow 2^{2n} \geq n^2 \rightarrow 2^n \geq n$
 $D_f = [1, 2]$



$\frac{2^{n+5}}{2^{n+4}} \in \mathbb{N} \rightarrow x \in \frac{2^{n+5}}{2^{n+4}} \rightarrow x \in \{ -\frac{2k-5}{2k-4} \mid k \in \mathbb{N} \}$

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ب) $y = \left(\frac{2^{n+5}}{2^{n+4}} \right)!$