

۲. اختیار پذیر خوب نوشتن

الف) $y = \frac{x+3}{2x^3+3x^2-11x+3} \Rightarrow 2x^3+3x^2-11x+3 \neq 0 \Rightarrow 2x^3+3x^2-11x+3 = (x+3)(2x^2-3x+1)$
 $\Rightarrow 2x^2-3x+1 = (2x-1)(x-1) \rightarrow y = \frac{x+3}{(x+3)(2x-1)(x-1)} \rightarrow x \neq -3, x \neq \frac{1}{2}, x \neq 1$

$D_f = R - \{-3, \frac{1}{2}, 1\}$

ب) $y = \frac{x+3}{2x^3+9x^2+10x+3} \rightarrow 2x^3+9x^2+10x+3 = (x+1)(x+3)(2x+1) \rightarrow x \neq -1, x \neq -3, x \neq -\frac{1}{2}$
 $\rightarrow x \neq -\frac{1}{2} \rightarrow D_f = R - \{-3, -1, -\frac{1}{2}\}$

الف) $y = \frac{x+3}{x^3-2x^2+2x-1} \rightarrow x^3-2x^2+2x-1 = (x-1)(x^2-x+1)$
 $\Delta < 0$

$x \neq 1 \Rightarrow D_f = R - \{1\}$

ب) $y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} \rightarrow \frac{x+3}{(x-1)(x^2-x+1)} > 0 \rightarrow x^2-x+1 > 0 \Rightarrow \frac{x+3}{x-1}$
 $\Delta < 0$

$x = -3, x = 1$ $\rightarrow x < -3, x > 1 \Rightarrow D_f = (-\infty, -3] \cup (1, +\infty)$

$y = \frac{2}{x^2-\Delta|x-1|-2x+\Delta} \rightarrow x > 1$ حالت $\Rightarrow |x-1| = x-1$

$x^2-\Delta(x-1)-2x+\Delta = x^2-7x+1+\Delta = (x-2)(x-\Delta) \Rightarrow x \neq 2, x \neq \Delta$

حالت $\Rightarrow x < 1 \rightarrow |x-1| = 1-x \Rightarrow x^2-\Delta(1-x)-2x+\Delta = x^2+3x = x(x+3)$
 $x \neq 0, x \neq -3 \rightarrow D_f = R - \{-3, 0, 2, \Delta\}$

الف) $y = \sqrt{-x-2} \rightarrow [-x]-2 > 0 \rightarrow [-x] > 2 \rightarrow -x > 2 \rightarrow x < -2$

$D_f = (-\infty, -2]$

ب) $y = \frac{\Delta x^2+4}{[x]^2-2[x]-3} \rightarrow [x]^2-2[x]-3 \neq 0 \rightarrow ([x]-3)([x]+1) \neq 0$

$\Rightarrow [x] \neq -1, [x] \neq 3 \rightarrow [x] = 3 \Rightarrow 3 \leq x < 4, [x] = -1 \Rightarrow -1 < x < 0$

$D_f = R - ([-1, 0) \cup [3, 4]) \rightarrow R - (-1, 0) \cup [3, 4)$

الف) $y = \sqrt{[x-\frac{1}{2}]+[x+\frac{1}{2}]} \rightarrow [x-\frac{1}{2}]+[x+\frac{1}{2}] > 0 \rightarrow [x-\frac{1}{2}]+[x+\frac{1}{2}+1-1] =$

$[x-\frac{1}{2}]+[x-\frac{1}{2}+1] = 2[x-\frac{1}{2}]+1 \Rightarrow 2[x-\frac{1}{2}] > -1 \rightarrow [x-\frac{1}{2}] > -\frac{1}{2}$

$[x-\frac{1}{2}] > 0 \rightarrow x-\frac{1}{2} > 0 \rightarrow x > \frac{1}{2} \rightarrow D_f = [\frac{1}{2}, +\infty)$

ب) $y = \sqrt{[x-\frac{1}{2}]+[\frac{1}{2}-x]} \rightarrow [\frac{1}{2}-x] = -[x-\frac{1}{2}] \rightarrow [x-\frac{1}{2}]+[\frac{1}{2}-x] > 0$

$x-\frac{1}{2} \in \mathbb{Z} \rightarrow \{x \mid x = k + \frac{1}{2}, k \in \mathbb{Z}\}$

الف) $y = \frac{\cot x + 1}{\tan x + 1} \rightarrow x \neq k\pi + \frac{\pi}{2}, x \neq k\pi, \tan x + 1 \neq 0 \Rightarrow \tan x \neq -1$

$x \neq k\pi - \frac{\pi}{4} \rightarrow D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{2}, k\pi - \frac{\pi}{4}\}$

ب) $y = \sqrt{1 - \sin^2 x} \rightarrow 1 - \sin^2 x \geq 0 \Rightarrow \sin^2 x \leq 1 \Rightarrow |\sin x| \leq 1$

$[-\frac{\pi}{2}, \frac{\pi}{2}] \Rightarrow D_f = [k\pi - \frac{\pi}{2}, k\pi + \frac{\pi}{2}]$

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

ب) $y = \sqrt{1 - 2\cos x} \rightarrow 1 - 2\cos x \geq 0 \Rightarrow \cos x \leq \frac{1}{2}$

زبانی بین $\frac{\pi}{3}$ تا $\frac{5\pi}{3}$

$D_f = [2k\pi + \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3}]$

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

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ب) $\cos y = \sqrt{5 - 2x} \rightarrow 0 \leq \sqrt{5 - 2x} \leq 1 \rightarrow 0 \leq 5 - 2x \leq 1 \rightarrow 5 - 2x \leq 1 \Rightarrow x \geq 2$
 $5 - 2x \geq 0 \Rightarrow x \leq \frac{5}{2} \Rightarrow D_f = [2, \frac{5}{2}]$

توجه: چون زیر رادیکال باید نامنفی باشد پس جواب $x \geq 2$ قرار دادیم.

الف) $y = \log_2(1 - \log_3 x) \rightarrow x > 0, 1 - \log_3 x > 0 \rightarrow \log_3 x < 1 \rightarrow x < 3$
 $D_f = (0, 3)$

ب) $y = \log_2(1 - \log_{\frac{1}{2}} x) \rightarrow 1 - \log_{\frac{1}{2}} x > 0 \rightarrow \log_{\frac{1}{2}} x < 1 \rightarrow x > (\frac{1}{2})^1 = \frac{1}{2}$
 $D_f = (\frac{1}{2}, +\infty)$

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الف) $y = \sqrt{x^2 - x^2} - 1 \Rightarrow x^2 - x^2 - 1 \geq 0 \rightarrow x^2 - x^2 \geq 1 \rightarrow x^2 - x^2 \geq 3$
 $\rightarrow x^2 - 4x + 4 \leq 0 \rightarrow (x-1)(x-3) \leq 0 \Rightarrow D_f = [1, 3]$

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ب) $y = \left(\frac{3x+5}{2x+2}\right)! \rightarrow \frac{3x+5}{2x+2} \in \mathbb{W} \rightarrow 3x+5 = 2Wx+2W \rightarrow 3x-2Wx = -5+2W$
 $x = \frac{-5+2W}{3-2W} \Rightarrow D_f = \{x \mid x = \frac{-5+2K}{3-2K}, K \in \mathbb{W}\}$