

۱۹, ۲۵

الف) $f(x) + 2$	ب) $f(x)$	ج) $f(x-1)$	د) $f(x)$	
				۱

✓

الف) $x^2 - 5x + 4 > 0 \rightarrow (x-4)(x-1) > 0$ $\begin{array}{c ccc} x & 1 & 4 & \\ \hline & + & - & + \end{array}$ $(-\infty, 1) \cup (4, +\infty)$	ب) $x^2 - 4x + 4 < 0 \rightarrow (x-2)^2 < 0$ $\begin{array}{c ccc} x & 2 & 2 & \\ \hline & + & - & + \end{array}$ $(2, 2)$	ج) $x^2 + 4x + 4 \geq 0 \rightarrow (x+2)^2 \geq 0$ $\begin{array}{c ccc} x & -2 & -2 & \\ \hline & + & - & + \end{array}$ $(-\infty, -2] \cup [-2, +\infty)$	د) $x^2 - 7x + 4 \leq 0 \rightarrow (x-4)(x-1) \leq 0$ $\begin{array}{c ccc} x & 1 & 4 & \\ \hline & + & - & + \end{array}$ $[1, 4]$	۲
--	---	---	--	---

✓

الف) $\frac{x^2 - 3x + 2}{x-5} < 0 \rightarrow \frac{(x-2)(x-1)}{x-5} < 0$ $\begin{array}{c ccc} x & 1 & 2 & 5 \\ \hline & + & - & + \end{array}$ $(-\infty, 1) \cup (2, 5)$	ب) $\frac{x^2 - 1}{x^2 - 4x + 4} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-2)^2} \geq 0$ $\begin{array}{c ccc} x & -1 & 2 & 1 \\ \hline & + & - & + \end{array}$ $(-\infty, -1] \cup (2, +\infty)$	۳
--	--	---

✓

الف) $y = \sqrt{\frac{x^2 - 1}{x^2 - x}} \rightarrow y = \sqrt{\frac{(x-1)(x+1)}{x(x-1)}} = \sqrt{\frac{x+1}{x}}$ $\begin{array}{c ccc} x & -1 & 0 & 1 \\ \hline & + & - & + \end{array}$ $D_f = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$	ب) $y = \sqrt{\frac{x^2 - 4}{x^2 - 5x + 4}} \rightarrow y = \sqrt{\frac{(x-2)(x+2)}{(x-4)(x-1)}}$ $\begin{array}{c ccc} x & -2 & 1 & 4 \\ \hline & + & - & + \end{array}$ $D_f = (-\infty, -2] \cup (1, 4) \cup (4, +\infty)$	۴
---	---	---

✓

$D_f = (-\infty, -2] \cup (1, 4) \cup (4, +\infty)$

الف) $y = \sqrt{4 - \sqrt{2 - x}}$ $\begin{cases} 2 - x \geq 0 \rightarrow x \leq 2 \\ 4 - \sqrt{2 - x} \geq 0 \rightarrow \sqrt{2 - x} \leq 4 \rightarrow 2 - x \leq 16 \rightarrow x \geq -14 \end{cases}$ $D_f = [-14, 2]$	ب) $y = \sqrt{3 - \sqrt{x - 2}}$ $\begin{cases} x - 2 \geq 0 \rightarrow x \geq 2 \\ 3 - \sqrt{x - 2} \geq 0 \rightarrow \sqrt{x - 2} \leq 3 \rightarrow x - 2 \leq 9 \rightarrow x \leq 11 \end{cases}$ $D_f = [2, 11]$	۵
---	--	---

✓

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

ب) $y = \sqrt{3|x|-9} \rightarrow 3|x|-9 \geq 0 \rightarrow 3|x| \geq 9 \rightarrow |x| \geq 3 \rightarrow x \geq 3 \text{ یا } x \leq -3$
 $D_f = (-\infty, -3] \cup [3, +\infty)$

(۲) ✓

الف) $y = \sqrt[3]{\frac{|x|+1}{|x|-3}} \rightarrow |x|-3 \neq 0 \rightarrow |x| \neq 3 \rightarrow x \neq \pm 3$
 $D_f = \mathbb{R} - \{\pm 3\}$

ب) $y = \sqrt[3]{\frac{\sqrt{x}+1}{\sqrt{x}-3}} \rightarrow \sqrt{x}-3 \neq 0 \rightarrow \sqrt{x} \neq 3 \rightarrow x \neq 9$
 $D_f = \mathbb{R} - \{9\}$

۱، ۵
 [۵، +∞)
 x ≥ 0 - رادیکال باید شریف شود

* رادیکال با منفی فرد محدودیتی برای مثبت یا منفی بودن ندارد *

الف) $y = \frac{\sin x}{2\cos x - 1} \rightarrow 2\cos x - 1 \neq 0 \rightarrow 2\cos x \neq 1 \rightarrow \cos x \neq \frac{1}{2}$
 $D_f = \mathbb{R} - \{2k\pi \pm \frac{\pi}{3}\}$

ب) $y = \frac{\cos x + 1}{2\sin x + 1} \rightarrow 2\sin x + 1 \neq 0 \rightarrow 2\sin x \neq -1 \rightarrow \sin x \neq -\frac{1}{2}$
 $D_f = \mathbb{R} - \{2k\pi - \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}\}$

ج) $y = \frac{\tan x + 2}{\cot x - 1} \rightarrow \cot x - 1 \neq 0 \rightarrow \cot x \neq 1$
 $D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{2}\}$

د) $y = \frac{\sin x}{x \sin^2 x - 3} \rightarrow x \sin^2 x - 3 \neq 0 \rightarrow x \sin^2 x \neq 3 \rightarrow \sin^2 x \neq \frac{3}{x}$
 $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}, 2k\pi - \frac{\pi}{2}\}$

۱، ۷، ۵
 بازه‌های که ناممکن است
 تعریف شود
 x ≠ ± π/۲

$y = \frac{1}{\sqrt{2|x-2| - \frac{1}{2}}}$
 $2|x-2| - \frac{1}{2} > 0 \rightarrow 2|x-2| > \frac{1}{2} \rightarrow |x-2| > \frac{1}{4}$
 $\Rightarrow \begin{cases} x-2 > \frac{1}{4} \rightarrow x > \frac{9}{4} \\ x-2 < -\frac{1}{4} \rightarrow x < \frac{7}{4} \end{cases} \rightarrow D_f = (-\infty, \frac{7}{4}) \cup (\frac{9}{4}, +\infty)$

(۲) ✓

الف) $y = \sqrt{4-2|x|} \rightarrow 4-2|x| \geq 0 \rightarrow 2|x| \leq 4 \rightarrow |x| \leq 2 \rightarrow -2 \leq x \leq 2$
 $D_f = [-2, 2]$

ب) $y = \sqrt{\frac{|x|}{|x|}}$
 $\frac{|x|}{|x|}$ همواره نامنفی است
 $|x| \neq 0 \rightarrow x \neq 0$
 $D_f = \mathbb{R} - \{0\}$

(۲) ✓