

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

$x^2 - 5x + 4 > 0 \rightarrow (x-3)(x-2) > 0$ $x^2 - 4x + 4 < 0 \rightarrow (x-2)(x-2) < 0$ $x^2 + 4x + 4 \geq 0 \rightarrow (x+2)(x+2) \geq 0$ $x^2 - 7x + 4 \leq 0 \rightarrow (x-4)(x-1) \leq 0$	$\frac{x}{+} \frac{3}{-} \frac{2}{+}$ $\frac{x}{+} \frac{2}{-} \frac{2}{+}$ $\frac{x}{+} \frac{-2}{-} \frac{-2}{+}$ $\frac{x}{+} \frac{1}{-} \frac{4}{+}$	$(-\infty, 2) \cup (3, +\infty)$ $(1, 2)$ $(-\infty, -2] \cup [-2, +\infty)$ $[1, 4]$	بازه جواب نامعادلات	2
--	--	--	----------------------------	---

$\frac{x^2 - 3x + 2}{x-5} < 0 \rightarrow \frac{(x-2)(x-1)}{x-5} < 0$ $\frac{x^2 - 1}{x^2 - 4x + 4} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-2)^2} \geq 0$	$\frac{x}{+} \frac{1}{-} \frac{2}{+} \frac{5}{+}$ $\frac{x}{+} \frac{-1}{-} \frac{1}{-} \frac{2}{+}$	$(-\infty, 1) \cup (2, 5)$ $(-\infty, -1] \cup (2, +\infty)$	3
--	---	---	---

$y = \sqrt{\frac{x^2 - 1}{x^2 - x}} \rightarrow y = \sqrt{\frac{(x-1)(x+1)}{x(x-1)}}$ $y = \sqrt{\frac{x^2 - 4}{x^2 - 5x + 4}} \rightarrow y = \sqrt{\frac{(x-2)(x+2)}{(x-2)(x-1)}}$	$\frac{x}{+} \frac{-1}{-} \frac{0}{-} \frac{1}{+}$ $\frac{x}{+} \frac{-2}{-} \frac{1}{-} \frac{4}{+}$	$D_f = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$ $D_f = (-\infty, -2] \cup (1, 2) \cup (2, +\infty)$	4
---	--	--	---

$y = \sqrt{4 - \sqrt{2 - x}}$ $y = \sqrt{3 - \sqrt{x - 2}}$	$\begin{cases} 2 - x \geq 0 \rightarrow x \leq 2 \\ 4 - \sqrt{2 - x} \geq 0 \rightarrow \sqrt{2 - x} \leq 4 \rightarrow 2 - x \leq 16 \rightarrow x \geq -14 \end{cases}$ $\xrightarrow{D_f} [-14, 2]$ $\begin{cases} x - 2 \geq 0 \rightarrow x \geq 2 \\ 3 - \sqrt{x - 2} \geq 0 \rightarrow \sqrt{x - 2} \leq 3 \rightarrow x - 2 \leq 9 \rightarrow x \leq 11 \end{cases}$ $\xrightarrow{D_f} [2, 11]$	5
--	---	---

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

6

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

7

* 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) $y = \frac{\tan x + 2}{\cot x - 1} \rightarrow \text{مخرج و کسرها با تعریف شوند} \rightarrow \cot x - 1 \neq 0 \rightarrow \cot x \neq 1$
 $D_f = \mathbb{R} - \{\frac{k\pi}{4}, k\pi + \frac{\pi}{4}\}$

د) $y = \frac{\sin x}{x \sin^2 x - 3} \rightarrow x \sin^2 x - 3 \neq 0 \rightarrow x \sin^2 x \neq 3 \rightarrow \sin x \neq \frac{\sqrt{3}}{x}$
 $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}\}$

8

$y = \frac{1}{\sqrt{2|x-2| - \frac{1}{x}}}$

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

$\Rightarrow \begin{cases} x-2 > \frac{1}{2x} \rightarrow x > \frac{1}{x} \\ x-2 < -\frac{1}{2x} \rightarrow x < -\frac{1}{x} \end{cases} \rightarrow D_f = (-\infty, \frac{1}{x}) \cup (\frac{1}{x}, +\infty)$

9

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) $y = \sqrt{\frac{|x|}{|x|}}$ عبارت $\frac{|x|}{|x|}$ همواره 1 است $\rightarrow |x| \neq 0 \rightarrow x \neq 0$
 $D_f = \mathbb{R} - \{0\}$

10