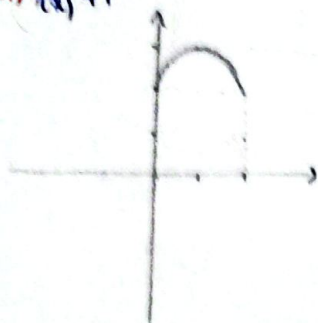


الف) $f(x) + 2$



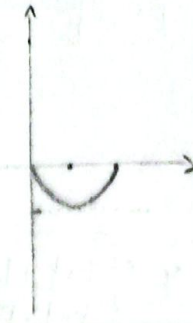
ب) $2f(x)$



ج) $f(x-1)$

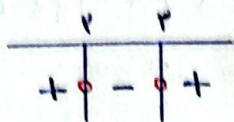


د) $-f(x)$



الف) $x^2 - 5x + 4 > 0 \rightarrow (x-1)(x-4) > 0$

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



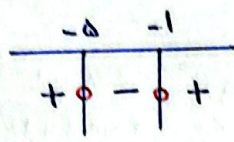
ب) $x^2 - 4x + 5 < 0 \rightarrow (x-1)(x-5) < 0$

$D_f = (1, 5)$



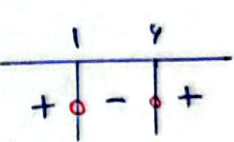
ج) $x^2 + 4x + 5 \geq 0 \rightarrow (x+1)(x+5) \geq 0$

$D_f = (-\infty, -5] \cup [-1, +\infty)$



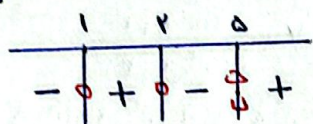
د) $x^2 - 7x + 4 \leq 0 \rightarrow (x-1)(x-4) \leq 0$

$D_f = [1, 4]$



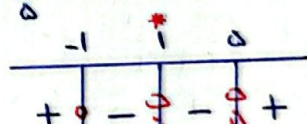
الف) $\frac{x^2 - 3x + 1}{x-5} < 0 \rightarrow \frac{(x-1)(x-2)}{(x-5)} < 0$

$D_f = (-\infty, 1) \cup (2, 5)$



ب) $\frac{x^2 - 1}{x^2 - 4x + 5} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0$

$D_f = (-\infty, -1] \cup (5, +\infty)$



الف) $\sqrt{\frac{x^2 - 1}{x^2 - x}}$

$\frac{x^2 - 1}{x^2 - x} \geq 0 \rightarrow$ همیشه برقرار است.

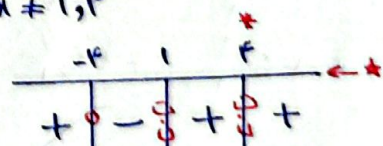
$x^2 - x \neq 0 \rightarrow x(x-1)(x+1) \neq 0 \Rightarrow x \neq 0, \pm 1$

$D_f = \mathbb{R} - \{0, \pm 1\}$

ب) $\sqrt{\frac{x^2 - 14}{x^2 - 5x + 4}} \rightarrow \frac{(x-4)(x+4)}{(x-1)(x-5)} \geq 0$

$(x-1)(x-5) \neq 0 \rightarrow x \neq 1, 5$

$D_f = (-\infty, -4] \cup (1, 4) \cup (5, +\infty)$



الف) $\sqrt{4 - \sqrt{2-x}}$

$4 - \sqrt{2-x} \geq 0 \rightarrow \sqrt{2-x} \leq 4 \rightarrow 2-x \leq 16 \rightarrow x \geq -14$

$2-x \geq 0 \rightarrow x \leq 2$

$D_f = [-14, 2]$

ب) $\sqrt{3 - \sqrt{x-2}}$

$3 - \sqrt{x-2} \geq 0 \rightarrow 3 \geq \sqrt{x-2} \rightarrow 9 \geq x-2 \rightarrow x \leq 11$

$x-2 \geq 0 \rightarrow x \geq 2$

$2 \leq x \leq 11$

$D_f = [2, 11]$

$$a) y = \sqrt{4-x^2}$$

$$4-x^2 \geq 0 \rightarrow x^2 \leq 4 \rightarrow x \leq 2 \Rightarrow -\sqrt{2} \leq x \leq \sqrt{2}$$

$$D_f = [-\sqrt{2}, \sqrt{2}]$$

$$b) y = \sqrt{3|x|-9}$$

$$3|x|-9 \geq 0 \rightarrow 3|x| \geq 9 \rightarrow |x| \geq 3$$

$$\Rightarrow x \geq 3, x \leq -3$$

$$D_f = (-\infty, -3] \cup [3, +\infty)$$

$$a) y = \sqrt{\frac{|x|+1}{|x|-3}}$$

$$|x|-3 \neq 0 \rightarrow |x| \neq 3 \Rightarrow x \neq \pm 3$$

$$D_f = \mathbb{R} - \{\pm 3\}$$

$$b) y = \sqrt{\frac{\sqrt{x}+1}{\sqrt{x}-3}}$$

$$\sqrt{x}-3 \neq 0 \rightarrow \sqrt{x} \neq 3 \Rightarrow x \neq 9$$

$$\sqrt{x} \rightarrow x \geq 0$$

$$D_f = [0, +\infty) - \{9\}$$

$$a) y = \frac{\sin x}{x \cos x - 1}$$

$$x \cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{x} \quad (4^\circ; 360^\circ)$$

$$D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{4}, k\pi + \frac{5\pi}{4} \right\}$$

$$b) y = \frac{\cos x + 1}{x \sin x + 1}$$

$$x \sin x + 1 \neq 0 \rightarrow \sin x \neq -\frac{1}{x} \quad (330^\circ; 210^\circ)$$

$$D_f = \mathbb{R} - \left\{ k\pi + \frac{3\pi}{4}, k\pi + \frac{11\pi}{4} \right\}$$

$$c) y = \frac{\tan x + x}{\cot x - 1} \rightarrow \sin x \neq 0 \quad (0^\circ; 180^\circ)$$

$$\cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \quad (45^\circ; 225^\circ)$$

$$D_f = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{4} \right\}$$

$$\cot x = \frac{\cos x}{\sin x}$$

$$d) y = \frac{\sin x + 1}{x \sin^2 x - 3}$$

$$x \sin^2 x - 3 \neq 0 \rightarrow \sin x \neq \frac{\sqrt{3}}{x} \quad (40^\circ; 140^\circ)$$

$$D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{6}, k\pi + \frac{5\pi}{6} \right\}$$

$$y = \frac{1}{\sqrt{x|x-1| - \frac{1}{x}}} \rightarrow x|x-1| - \frac{1}{x} > 0 \rightarrow x|x-1| > \frac{1}{x} \rightarrow |x-1| > \frac{1}{x}$$

$$\rightarrow x-1 > \frac{1}{x} \rightarrow x > \frac{1}{x-1}$$

$$\rightarrow x-1 < -\frac{1}{x} \rightarrow x < \frac{1}{x-1}$$

$$D_f = (-\infty, \frac{1}{x-1}) \cup (\frac{1}{x-1}, +\infty)$$

$$a) y = \sqrt{4-|x|}$$

$$4-|x| \geq 0 \rightarrow |x| \leq 4 \rightarrow |x| \leq 2$$

$$\rightarrow -2 \leq x \leq 2$$

$$D_f = [-2, 2]$$

$$b) y = \sqrt{\frac{|x|}{|x|}} \rightarrow 0 \leq 1$$

$$x \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$$