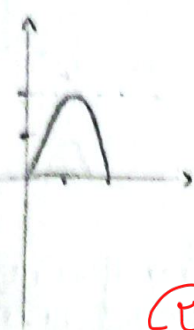


الف) $f(x) + 2$



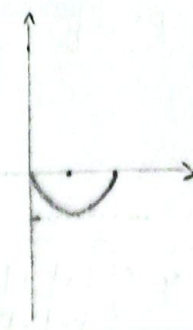
ب) $2f(x)$



ج) $f(x-1)$

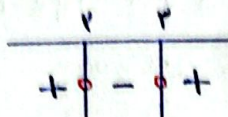


د) $-f(x)$



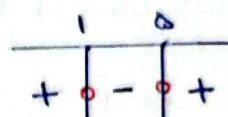
✓

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



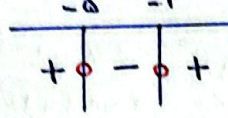
$D_f = (-\infty, 1) \cup (4, +\infty)$

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



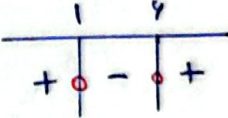
$D_f = (1, 5)$

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



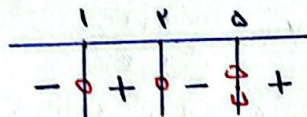
$D_f = (-\infty, -5] \cup [-1, +\infty)$

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



$D_f = [1, 4]$

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



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

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

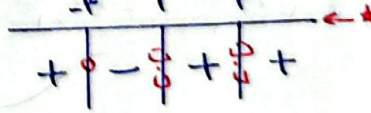
$\rightarrow \frac{x^2 - 1}{x^2 - x} \geq 0 \rightarrow \frac{x^2 - 1}{x(x-1)} \geq 0$

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

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

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

$\rightarrow (x-1)(x-4) \neq 0 \rightarrow x \neq 1, 4$



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

الف) $\sqrt{x - \sqrt{x-4}}$

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

$\rightarrow x-4 \geq 0 \rightarrow x \geq 4$

$D_f = [-14, 4]$

ب) $\sqrt{3 - \sqrt{x-2}}$

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

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

$D_f = [2, 11]$

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

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

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

1.5b

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

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

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

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

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

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

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

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

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

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

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

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

$$x \cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{x} \quad (4^\circ; 30^\circ)$$

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

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

$$x \sin x + 1 \neq 0 \rightarrow \sin x \neq -\frac{1}{x} \quad (330^\circ; 16^\circ)$$

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

$$c) y = \frac{\tan x + x}{\cot x - 1}$$

$$\sin x \neq 0 \quad (0, 180^\circ) \quad c \cdot \sin \neq 0$$

$$\cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \quad (45^\circ; 135^\circ) \quad x \neq k\pi + \frac{\pi}{4}$$

$$D_f = \mathbb{R} - \left\{ \frac{k\pi}{2}, k\pi + \frac{\pi}{4} \right\}$$

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

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

$$x \sin^2 x - 3 \neq 0 \rightarrow \sin x \neq \pm \frac{\sqrt{3}}{x} \quad (40^\circ; 16^\circ)$$

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

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

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

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

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

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

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

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

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

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

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