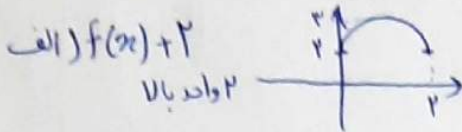
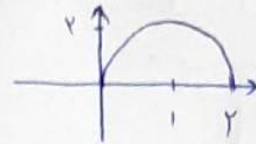
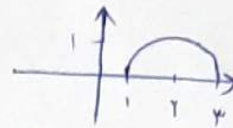


ب) $2f(x)$



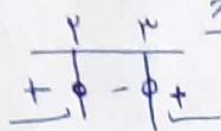
ج) $f(x-1)$



د) $-f(x)$



الف) $x^2 - 5x + 4 > 0$

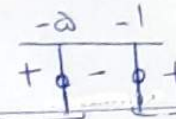


$x \in (-\infty, 1) \cup (4, +\infty)$

$x \in (-\infty, -5] \cup [-1, +\infty)$

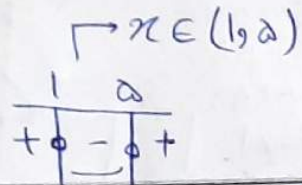
$(x-1)(x-4) > 0$

ج) $x^2 + 4x + 5 > 0$



$(x+1)(x+5) > 0$

ب) $x^2 - 4x + 5 < 0$

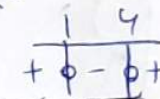


$x \in (1, 5)$

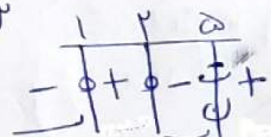
د) $x^2 - 7x + 4 \leq 0$

$x \in [1, 4]$

$(x-1)(x-4) \leq 0$

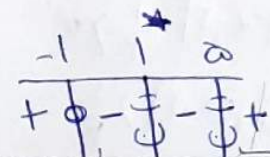


الف) $\frac{x^2 - 3x + 2}{x - 5} < 0 \rightarrow \frac{(x-1)(x-2)}{(x-5)}$



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

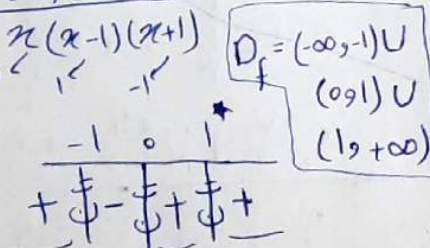
ب) $\frac{x^2 - 1}{x^2 - 4x + 5} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-1)(x-5)}$



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

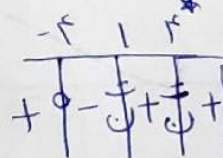
الف) $\sqrt{\frac{x^3 - 1}{x^2 - 2x}} = \frac{(x-1)(x^2 + x + 1)}{x(x-1)(x+1)}$

$\frac{x^3 + 0x^2 + 0x - 1}{-x^3 + 0x^2 + 0x + 1} \cdot \frac{x-1}{-x^2 + x + 1}$



$D_f = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$

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



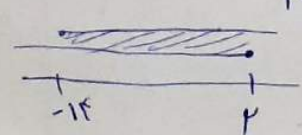
$D_f = (-\infty, -4] \cup (1, 4) \cup (4, +\infty)$

الف) $y = \sqrt{4 - \sqrt{2 - x}}$

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

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

$2 - x \leq 14 \rightarrow x \geq -12$



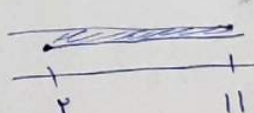
$D_f = [-12, 2]$

ب) $\sqrt{3 - \sqrt{x - 2}}$

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

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

$x - 2 \leq 9 \rightarrow x \leq 11$

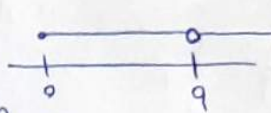


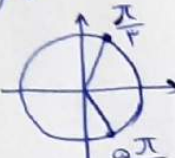
$D_f = [2, 11]$

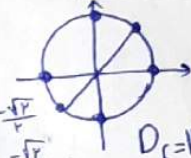
الف) $y = \sqrt{4-2x^2}$
 $4-2x^2 \geq 0$
 $\frac{4}{2} \geq \frac{2x^2}{2} \rightarrow x^2 \leq 2 \rightarrow -\sqrt{2} \leq x \leq \sqrt{2}$
 $D_f = [-\sqrt{2}, \sqrt{2}]$

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

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

ب) $y = \sqrt{\frac{\sqrt{x}+1}{\sqrt{x}-3}}$
 $\sqrt{x} \geq 0 \rightarrow x \geq 0$
 $\sqrt{x}-3 \neq 0$
 $\sqrt{x} \neq 3 \rightarrow x \neq 9$

 $D_f = [0, 9) \cup (9, +\infty)$

الف) $2\cos x - 1 \neq 0$
 $\cos x \neq \frac{1}{2}$
 $\left| \frac{1}{2} \right| \quad \left| \frac{1}{2} \right|$

 $D_f = \mathbb{R} - \left\{ 2k\pi \pm \frac{\pi}{3} \right\}$

ج) $\cos x \neq 0$
 $\sin x \neq 0$
 $\cot x - 1 \neq 0$
 $\frac{\cos x}{\sin x} \neq 1$
 $\left| \frac{\sqrt{2}}{2} \right| \quad \left| \frac{\sqrt{2}}{2} \right|$

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

ب) $2\sin x + 1 \neq 0$
 $\sin x \neq -\frac{1}{2}$
 $\left| \frac{\sqrt{3}}{2} \right| \quad \left| -\frac{\sqrt{3}}{2} \right|$

 $D_f = \mathbb{R} - \left\{ 2k\pi + \frac{7\pi}{6}, 2k\pi + \frac{11\pi}{6} \right\}$

د) $2\sin^2 x - 3 \neq 0$
 $\sin^2 x \neq \frac{3}{2}$
 $\sin x \neq \pm \sqrt{\frac{3}{2}}$

 $D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4}, k\pi + \frac{5\pi}{4}, k\pi + \frac{7\pi}{4} \right\}$

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

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

$y = \sqrt{\frac{|x|}{|x|}}$
 $\frac{|x|}{|x|} = 1 \checkmark$
 $\frac{|x|}{|x|} = 1 \checkmark$
 $0 \rightarrow \frac{0}{0} \alpha$
 $D_f = \mathbb{R} - \{0\}$