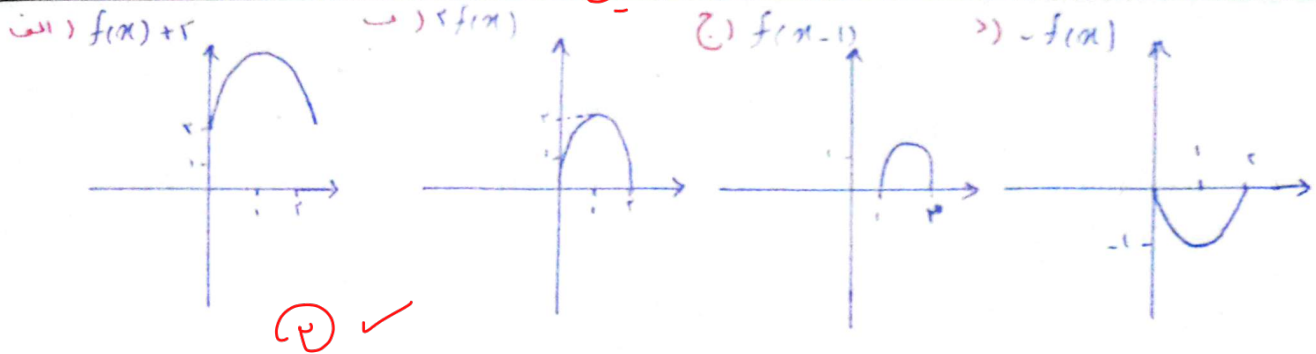


مسئله ۲ آیین



الف) $x^2 - 5x + 4 > 0 \Rightarrow (x-2)(x-1) > 0$
 $\Rightarrow x < 1$ or $x > 2$
 $(-\infty, 1) \cup (2, +\infty)$

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

ج) $x^2 + 4x + 5 \geq 0 \Rightarrow (x+1)(x+5) \geq 0$
 $\Rightarrow x \leq -5$ or $x \geq -1$
 $(-\infty, -5] \cup [-1, +\infty)$

د) $x^2 - 7x + 4 \leq 0 \Rightarrow (x-1)(x-4) \leq 0$
 $\Rightarrow 1 \leq x \leq 4$
 $[1, 4]$

الف) $\frac{x^2 - 2x + 1}{x-2} < 0$
 $\Rightarrow \frac{(x-1)(x-1)}{x-2} < 0 \Rightarrow 1 < x < 2$
 $(1, 2)$

ب) $\frac{x^2 - 1}{x^2 - 4x + 5} \geq 0$
 $\Rightarrow \frac{(x+1)(x-1)}{(x-1)(x-5)} \geq 0 \Rightarrow -1 \leq x < 5$
 $[-1, 5)$

الف) $y = \sqrt{\frac{x^2 - 1}{x^2 - x}}$
 $\Rightarrow \frac{x^2 - 1}{x^2 - x} \geq 0 \Rightarrow \frac{(x-1)(x+1)}{x(x-1)(x+1)} \geq 0$
 $\Rightarrow \frac{1}{x} \geq 0 \Rightarrow x > 0$
 $D_f = \mathbb{R} - [-1, 0] - \{1\}$

ب) $y = \sqrt{\frac{x^2 - 12}{x^2 - 2x + 5}}$
 $\Rightarrow \frac{x^2 - 12}{x^2 - 2x + 5} \geq 0 \Rightarrow \frac{(x-4)(x+3)}{(x-1)(x-5)} \geq 0$
 $\Rightarrow x \leq -3$ or $1 < x < 5$
 $D_f = \mathbb{R} - (-3, 1) - \{5\}$

الف) $y = \sqrt{4 - \sqrt{2-x}}$
 $\Rightarrow 4 - \sqrt{2-x} \geq 0 \Rightarrow \sqrt{2-x} \leq 4$
 $\Rightarrow 2-x \leq 16 \Rightarrow x \geq -14$
 $D_f = [-14, 2]$

ب) $y = \sqrt{5 - \sqrt{x-2}}$
 $\Rightarrow 5 - \sqrt{x-2} \geq 0 \Rightarrow \sqrt{x-2} \leq 5$
 $\Rightarrow x-2 \leq 25 \Rightarrow x \leq 27$
 $D_f = [2, 27]$

الف) $y = \sqrt{4 - x^2}$ $4 - x^2 \geq 0$ $\Rightarrow x^2 \leq 4$ $\Rightarrow x \leq 2, x \geq -2$ $\Rightarrow D_f = [-2, 2]$	ب) $y = \sqrt{ x - 4}$ $\Rightarrow x - 4 \geq 0$ $\Rightarrow x \geq 4$ $\Rightarrow x \geq 4 \Rightarrow x \geq 4 \text{ or } x \leq -4$ $D_f = (-\infty, -4] \cup [4, +\infty)$	6
الف) $y = \sqrt{\frac{ x +1}{ x -2}}$ $x - 2 \neq 0$ $\Rightarrow x \neq 2$ $\Rightarrow x \neq \pm 2$ $D_f = \mathbb{R} - \{2, -2\}$	ب) $y = \sqrt{\frac{\sqrt{x}+1}{\sqrt{x}-2}}$ $\sqrt{x} - 2 \neq 0$ $\Rightarrow \sqrt{x} \neq 2$ $\Rightarrow x \neq 4$ $\Rightarrow D_f = [0, +\infty) - \{4\}$	7
الف) $y = \frac{\sin x}{2\cos x - 1}$ $\Rightarrow 2\cos x \neq 1$ $\Rightarrow \cos x \neq \frac{1}{2}$ $\Rightarrow x \neq \pm \frac{\pi}{3} + 2k\pi$ ج) $y = \frac{\tan x + 2}{\cot x - 1}$ $\Rightarrow \sin x, \cos x \neq 0$ $\cot x \neq 1$ $\Rightarrow \sin x \neq \cos x$	ب) $y = \frac{\cos x + 1}{2\sin x + 1}$ $\Rightarrow 2\sin x + 1 \neq 0$ $\Rightarrow \sin x \neq -\frac{1}{2}$ $\Rightarrow D_f = \mathbb{R} - \{x \mid x = \frac{7\pi}{6} + 2k\pi, x = \frac{11\pi}{6} + 2k\pi\}$ د) $y = \frac{\sin x + 1}{2\sin^2 x - 2}$ $\Rightarrow 2\sin^2 x - 2 \neq 0$ $\Rightarrow \sin^2 x \neq 1$ $\Rightarrow \sin x \neq \pm 1$ $\Rightarrow D_f = \mathbb{R} - \{x \mid x = \frac{\pi}{2} + k\pi, x = \frac{3\pi}{2} + k\pi\}$	8
$y = \frac{1}{\sqrt{ x-2 - \frac{1}{x}}}$ ① $x-2 - \frac{1}{x} > 0 \Rightarrow x-2 > \frac{1}{x}$ $\Rightarrow x-2 > \frac{1}{x} \Rightarrow x > \frac{1}{x-2} \text{ or } x < \frac{1}{x-2}$ ② $\sqrt{ x-2 - \frac{1}{x}} \neq 0$ $\Rightarrow x-2 \neq \frac{1}{x}$ $\Rightarrow x-2 \neq \frac{1}{x} \Rightarrow x \neq \frac{1}{x-2}, x \neq \frac{1}{x-2}$	③ $\Rightarrow D_f = (-\infty, 1) \cup (2, +\infty)$	9
الف) $y = \sqrt{4 - x }$ $4 - x \geq 0$ $\Rightarrow x \leq 4$ $\Rightarrow x \leq 4, x \geq -4$ $\Rightarrow D_f = [-4, 4]$	ب) $y = \sqrt{\frac{ x }{ x }}$ $x \neq 0, \frac{ x }{ x } \geq 0 \Rightarrow \frac{ x }{ x } \Rightarrow 1$ $\Rightarrow D_f = \mathbb{R} - \{0\}$	10