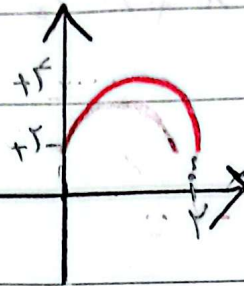


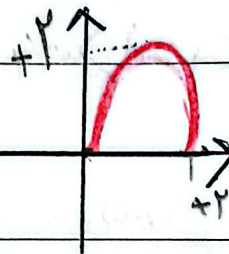
تغییرات

تکلیف ۱

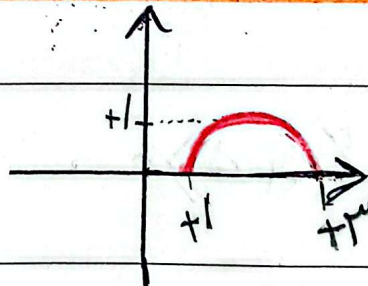
۱) $f(x) + 2$



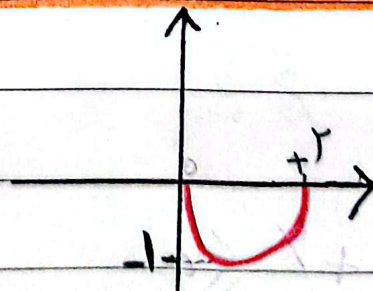
۲) $2f(x)$



۳) $f(x-1)$



۴) $-f(x)$



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

x	-1	4
y	+	-
	+	+

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

ب) $x^2 - 4x + 4 > 0$ $(x-4)(x-1) > 0$

x	1	4
y	+	-
	+	+

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

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

x	-4	-1
y	+	-
	+	+

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

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

x	1	4
y	+	-
	+	+

$[1, 4]$

تمرین ۱۲

۳

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

x		$+1$	$+2$	$+1$
y	$-$	$+$	$+$	$+$

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

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

x		-1	$+1$	$+2$
y	$+$	$+$	$-$	$+$

$(-\infty, -1] \cup (+2, +\infty)$

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

$x \neq 1, -1$

x		-1	0	$+1$
y	$+$	$-$	$+$	$+$

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

د) $y = \sqrt{\frac{x^2 - 1}{x^2 - 4x + 4}}$ $\frac{x^2 - 1}{x^2 - 4x + 4} \geq 0$ $\frac{(x - 1)(x + 1)}{(x - 2)(x - 1)} \geq 0$

x		-1	$+1$	$+2$
y	$+$	$+$	$-$	$+$

$D_f: (-\infty, -1] \cup (+1, +2) \cup (+2, +\infty)$

تمرین اول

- ۵

الف) $y = \sqrt{4 - \sqrt{2-x}}$

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

$4 - \sqrt{2-x} \geq 0 \Rightarrow 4 \geq \sqrt{2-x} \Rightarrow 16 \geq 2-x \Rightarrow x \geq -14$ II

I $\cup$ II $\Rightarrow -14 \leq x \leq 2 \Rightarrow D_f = [-14, 2]$

ب) $y = \sqrt{3 - \sqrt{x-2}}$

$x-2 \geq 0 \Rightarrow x \geq 2$ I

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

I $\cup$ II $\Rightarrow 2 \leq x \leq 11 \Rightarrow D_f = [2, 11]$

- ۶

الف) $y = \sqrt{4 - 2x^2}$

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

$-\sqrt{2} \leq x \leq \sqrt{2}$

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

ب) $y = \sqrt{3|x|-9}$

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

$\begin{cases} x \geq 3 \\ x \leq -3 \end{cases}$

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

تمرین اول

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

$D_f : \mathbb{R} - \{+3, -3\}$

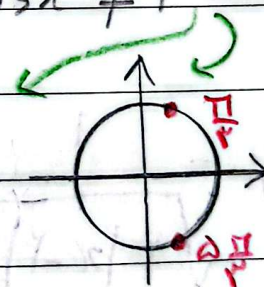
ب) $y = \sqrt[3]{\frac{\sqrt{x}-1}{\sqrt{x}-3}}$ $\rightarrow x \geq 0$
 $\rightarrow \sqrt{x}-3 \neq 0 \rightarrow \sqrt{x} \neq 3 \rightarrow x \neq 9$

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

الف) $y = \frac{\sin x}{y \cos x - 1}$ $\rightarrow y \cos x - 1 \neq 0 \rightarrow y \cos x \neq 1$

$\cos x \neq \frac{1}{y}$

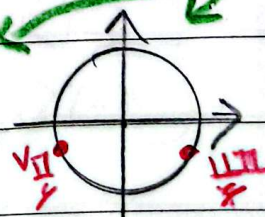
$D_f = \mathbb{R} - \{y k \pi - \frac{\pi}{y}, y k \pi + \frac{\pi}{y}\}$



ب) $y = \frac{\cos x + 1}{y \sin x + 1}$ $\rightarrow y \sin x + 1 \neq 0 \rightarrow y \sin x \neq -1$

$\rightarrow \sin x \neq -\frac{1}{y}$

$D_f : \mathbb{R} - \{y k \pi + \frac{y \pi}{2}, y k \pi + \frac{3y \pi}{2}\}$

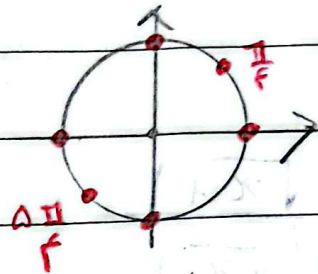


تمرین ۱

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

$\rightarrow \begin{cases} \sin x \neq 0 \rightarrow x \neq k\pi \\ \cos x \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2} \\ \cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow x \neq k\pi + \frac{\pi}{4} \end{cases}$

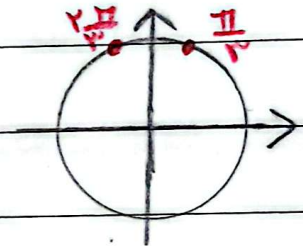
$D_f: \mathbb{R} - \left\{ \frac{k\pi}{4}, k\pi, \frac{\pi}{4} \right\}$



د) $y = \frac{\sin x + 1}{f \sin x - 3}$

$\rightarrow f \sin^2 x - 3 \neq 0 \rightarrow f \sin^2 x \neq 3 \rightarrow$
 $\rightarrow \sin^2 x \neq \frac{3}{f} \rightarrow \sin x \neq \pm \sqrt{\frac{3}{f}}$

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



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

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

$\begin{cases} x-2 > \frac{1}{2f} \rightarrow x > \frac{4}{f} \\ x-2 < -\frac{1}{2f} \rightarrow x < \frac{4}{f} \end{cases}$

$\frac{4}{f} < x < \frac{4}{f}$

$D_f: \left(\frac{4}{f}, \frac{4}{f} \right)$

محدود کردن

$$f) y = \sqrt{4 - 2|x|}$$

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

$$|x| \leq 2$$

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

$$Df = [-2, +2]$$

$$g) y = \sqrt{\frac{|x|}{|x|}}$$

$$|x| \neq 0 \quad x \neq 0$$

$$Df = \mathbb{R} - \{0\}$$

$$\frac{|x|}{|x|} \geq 0$$

مماسه برقرار است زیرا
داخل قدر مطلق همواره نامنفی
است