

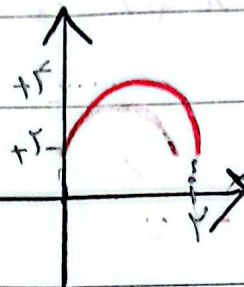
تغییرات

۱۸, ۷۶

تکلیف ۱

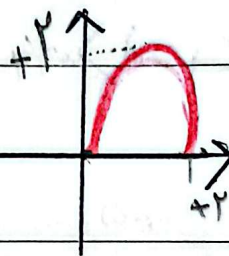
۱-

$f(x) + 2$ را رسم کن

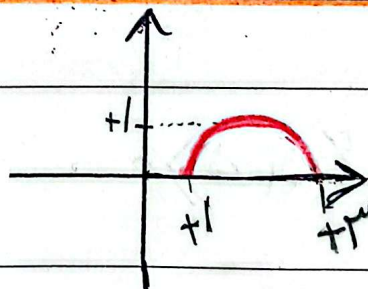


۲- $2f(x)$

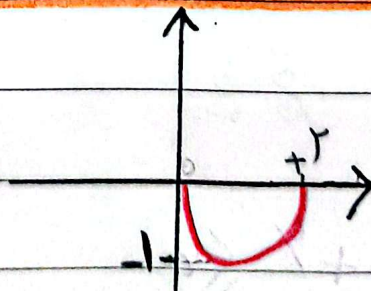
✓ (۲)



۳- $f(x-1)$



۴- $-f(x)$



الف) $x^2 - 2x + 4 > 0$ $(x - 1)(x - 3) > 0$

x	$+1$	$+3$
y	$+ \circ -$	$- \circ +$
	ϵ	ϵ

$(-\infty, 1) \cup (3, +\infty)$

ل.م.د

ب) $x^2 - 4x + 4 \geq 0$ $(x - 2)(x - 2) \geq 0$

x	$+2$	$+2$
y	$+ \circ -$	$- \circ +$
	ϵ	ϵ

$(-\infty, 2) \cup (2, +\infty)$
(ل.م.د)

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

x	-1	-1
y	$+ \circ -$	$- \circ +$
	ϵ	ϵ

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

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

x	$+2$	$+2$
y	$+ \circ -$	$- \circ +$
	ϵ	ϵ

$[2, 2]$

تمرین ۱

۳

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

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

$0, +1, -1$ ✓

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

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	$-$	$+$	$+$
y	$+$	$-$	$+$

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

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 ۱۲۵

$$\text{جواب) } \sqrt{\frac{|x|+1}{|x|-3}} \rightarrow |x|-3 \neq 0 \rightarrow |x| \neq 3 \rightarrow x \neq \pm 3$$

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

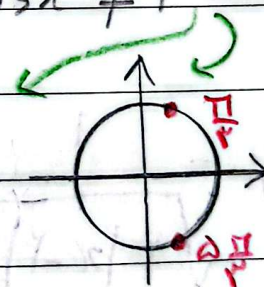
$$\text{جواب) } \sqrt{\frac{\sqrt{x}-1}{\sqrt{x}-3}} \rightarrow x \geq 0 \quad \sqrt{x}-3 \neq 0 \quad \sqrt{x} \neq 3 \quad x \neq 9$$

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

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

$$D_f = \mathbb{R} - \left\{ yk\pi - \frac{\pi}{y}, yk\pi + \frac{\pi}{y} \right\}$$

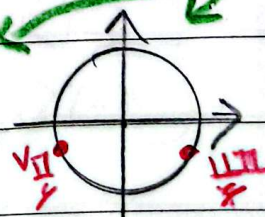
$$\cos x \neq \frac{1}{y}$$



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

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

$$D_f \circ \mathbb{R} - \left\{ yk\pi + \frac{y\pi}{2}, yk\pi + \frac{3y\pi}{2} \right\}$$

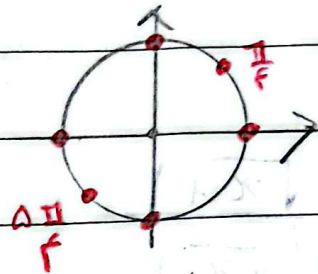


سوال ۱۳

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

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

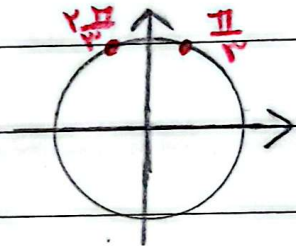
$D_f: \mathbb{R} - \left\{ \frac{k\pi}{4}, k\pi, \frac{\pi}{4} \right\}$



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

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

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



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

$\begin{aligned} 2|x-2| - \frac{1}{f} &> 0 \\ 2|x-2| &> \frac{1}{f} \\ |x-2| &> \frac{1}{2f} \end{aligned}$

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

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

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

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$D_f = (-\infty, \frac{4}{f}) \cup (\frac{4}{f}, +\infty)$

مقادیر

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

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

$$|x| \leq 2$$

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

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

✓

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

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

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

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

✓

مماسه برقرار است زیرا
داخل قدر مطلق همواره نامنفی
است