نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ۲ ... کلاس ... دفتر ...

۱

$\frac{1}{x-1} = |x-1|$

$\frac{1}{x-1} = x-1 \Rightarrow x^2-2x+1 = 1 \Rightarrow x^2-2x = 0 \rightarrow$ (۱) $x=0$ (۲) $x=2$

$\frac{1}{x-1} = -x+1 \Rightarrow -x^2+2x-1 = 1 \Rightarrow x^2-2x+2 = 0 \Rightarrow \Delta < 0 \rightarrow$ غ ق ق

if $x=0 \Rightarrow \frac{1}{-1} = |-1| \Rightarrow 1 = -1$ ✗ (۱)

if $x=2 \Rightarrow \frac{1}{2-1} = |2-1| \Rightarrow 1 = 1$ ✓ (۲)

$x = 2$

۲

ف) $\left|\frac{2x-1}{x}\right| < 2$

$\frac{2x-1}{x} < 2 \Rightarrow \frac{2x-1}{x} - 2 < 0 \Rightarrow \frac{2x-1-2x}{x} < 0 \Rightarrow \frac{-1}{x} < 0 \Rightarrow x > 0$ (۱)

$-2 < \frac{2x-1}{x} \rightarrow \frac{2x-1}{x} + 2 > 0 \Rightarrow \frac{4x-1}{x} > 0$ (۲)

(۱) ∪ (۲) $\Rightarrow (-\infty, 0) \cup [\frac{1}{4}, +\infty)$

ب) $\left|\frac{x-2}{2x+1}\right| > 1$

$\frac{x-2}{2x+1} > 1 \Rightarrow \frac{x-2-2x-1}{2x+1} > 0 \Rightarrow \frac{x+3}{2x+1} < 0$ (۱) $(-3, -\frac{1}{2})$

$\frac{x-2}{2x+1} < -1 \Rightarrow \frac{x-2+2x+1}{2x+1} < 0 \Rightarrow \frac{3x-1}{2x+1} < 0 \Rightarrow (-\frac{1}{2}, \frac{1}{3})$ (۲)

(۱) ∪ (۲) $\Rightarrow (-3, -\frac{1}{2}) - \{-2\} - \{-\frac{1}{2}\}$

۳

۱) $x^2 < |x+4| \rightarrow |x-a| < \beta$ ؟

$x^2 - x - 4 < 0 \Rightarrow (x-3)(x+2) < 0 \Rightarrow -2 < x < 3$

$\frac{3-2}{2} = \frac{1}{2}$

$|x - \frac{1}{2}| < 3 - \frac{1}{2} \Rightarrow |x - \frac{1}{2}| < \frac{5}{2} \Rightarrow a = \frac{1}{2}, \beta = \frac{5}{2}$

۲) $x^2 + x + 4 < 0 \rightarrow \Delta < 0 = \mathbb{R}$

غ ق ق

۴

$y = |x+1| - |2x| + |x-2|$

	-1		0		2	
$x+1$	$-$	0	$+$	$+$	$+$	
$-2x$	$+$		$+$	0	$-$	
$x-2$	$-$		$-$		$-$	0	$+$
	$-2x+1$		$-x+3$		$2x-3$	

(۱) $-2x+1$ (۲) $-x+3$ (۳) $2x-3$

Max $= 3$, Min $= -1$

$[-1, 3] \oplus = 4$

۵

$y = |\frac{1}{2}x| - 2 \rightarrow y = |\frac{1}{2}x + 4| - 1$

$|\frac{x}{2}+2| - 1 = |\frac{1}{2}x| - 2 \rightarrow \frac{x}{2} + 2 - 1 = -\frac{x}{2} - 2 \Rightarrow x = -2-2+1$

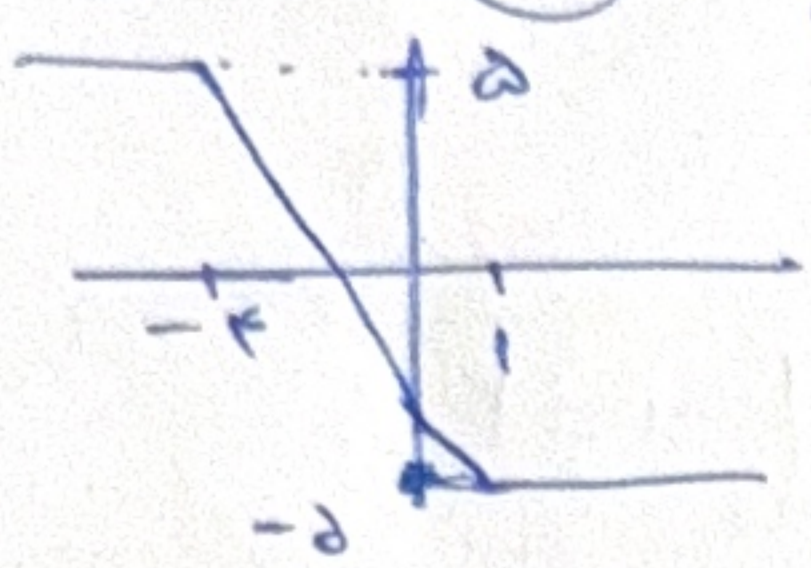
$= -4+1$

$x = -3$

۶

الف) $f(x)=[|1-x|-|x+4|]$

$|x-1|-|x+4|$ ① ④-



در براکت → $R_f=\{-5,-4,-3,-2,-1,0,1,2,3,4,5\}$

ب) $f(x)=\frac{1}{x}-[\frac{x+1}{x}]$

$\frac{x+1}{x} \to 1+\frac{1}{x}$ ← ۱ بیرون از براکت

$f(x)=\frac{1}{x}-1-[\frac{1}{x}] \to \underbrace{\frac{1}{x}-[\frac{1}{x}]}-1$

مثل $\underbrace{x-[x]}_{[0,1)}$

$R_f=[-1,0)$

۷

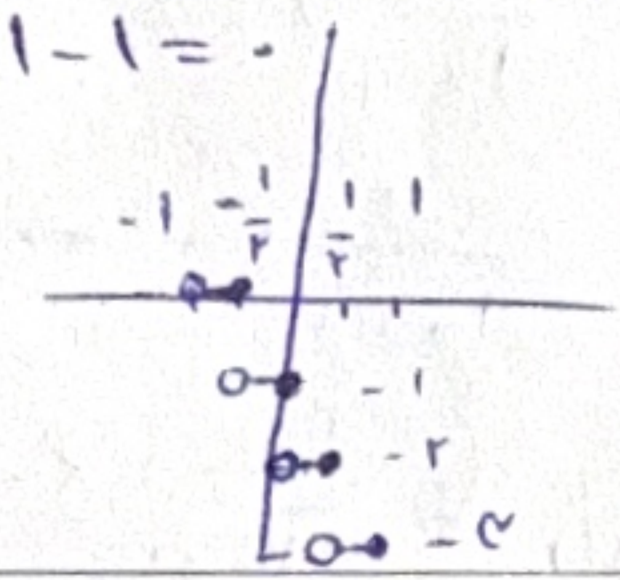
الف) $y=[-2x]-1 \quad x\in(-1,1) \to -1<x<1 \xrightarrow{x-2x} 2>-2x>-2$

$-1<-2x<0 \quad 0<x<\frac{1}{2} \Rightarrow y=-1-1=-2$

$0\le -2x<1 \Rightarrow -\frac{1}{2}<x\le 0 \Rightarrow y=0-1=-1$

$1\le -2x<2 \to -1<x\le -\frac{1}{2} \Rightarrow y=1-1=0$

$-2<-2x<-1 \to 1>x>\frac{1}{2} \Rightarrow y=-3$

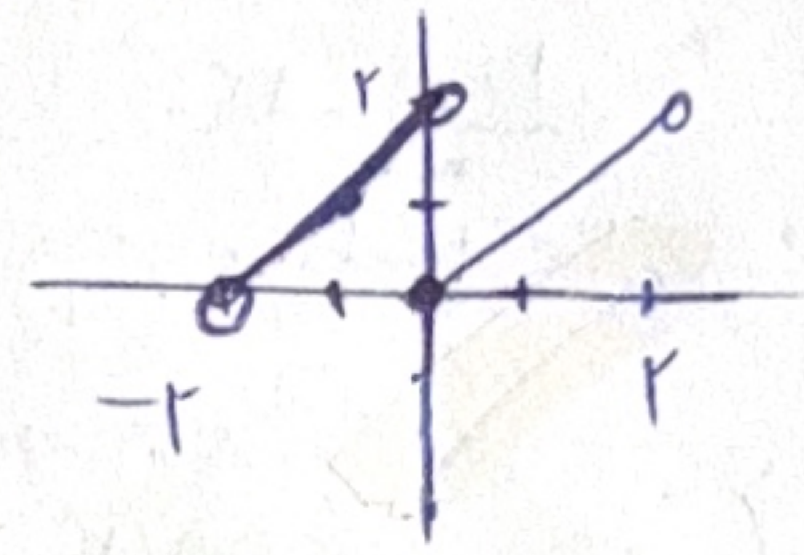


ب) $y=x-2[\frac{x}{2}] \quad x\in(-2,2)$

$-2<x<2 \to -1<\frac{x}{2}<1$

$-1\le \frac{x}{2}<0 \to -2\le x<0 \Rightarrow x+2$

$0\le \frac{x}{2}<1 \to 0\le x<2 \Rightarrow x$



۸

الف) $y=[||x|-1|] \quad x\in[-2,2]$

$-2\le x<-1 \to 1<|x|\le 2$

$-1\le x<0 \to 0<|x|\le 1$

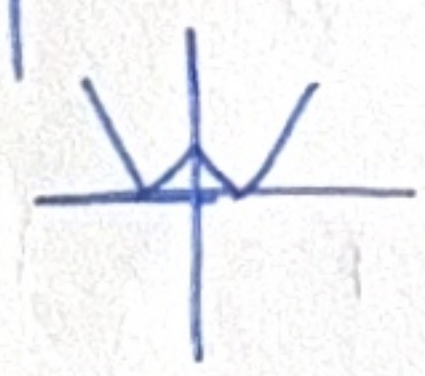
$0\le x<1 \to 0\le |x|<1$

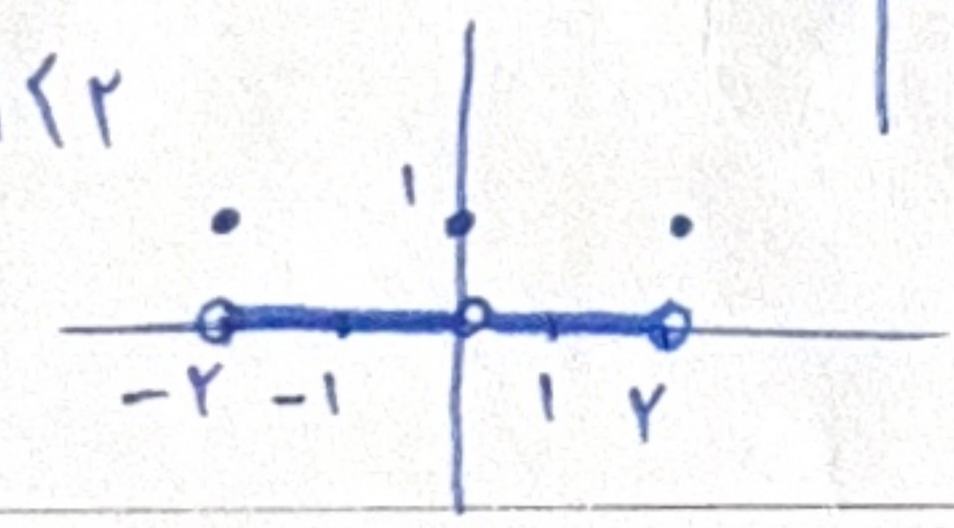
$1\le x<2 \to 1\le |x|<2$

$x=2$

$|x|-1$

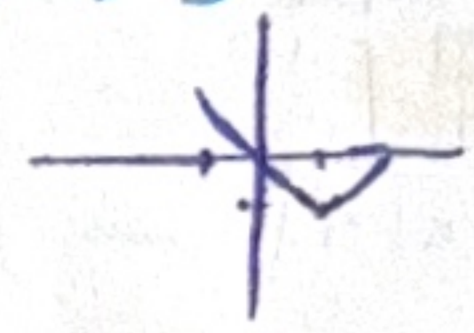
$||x|-1|$





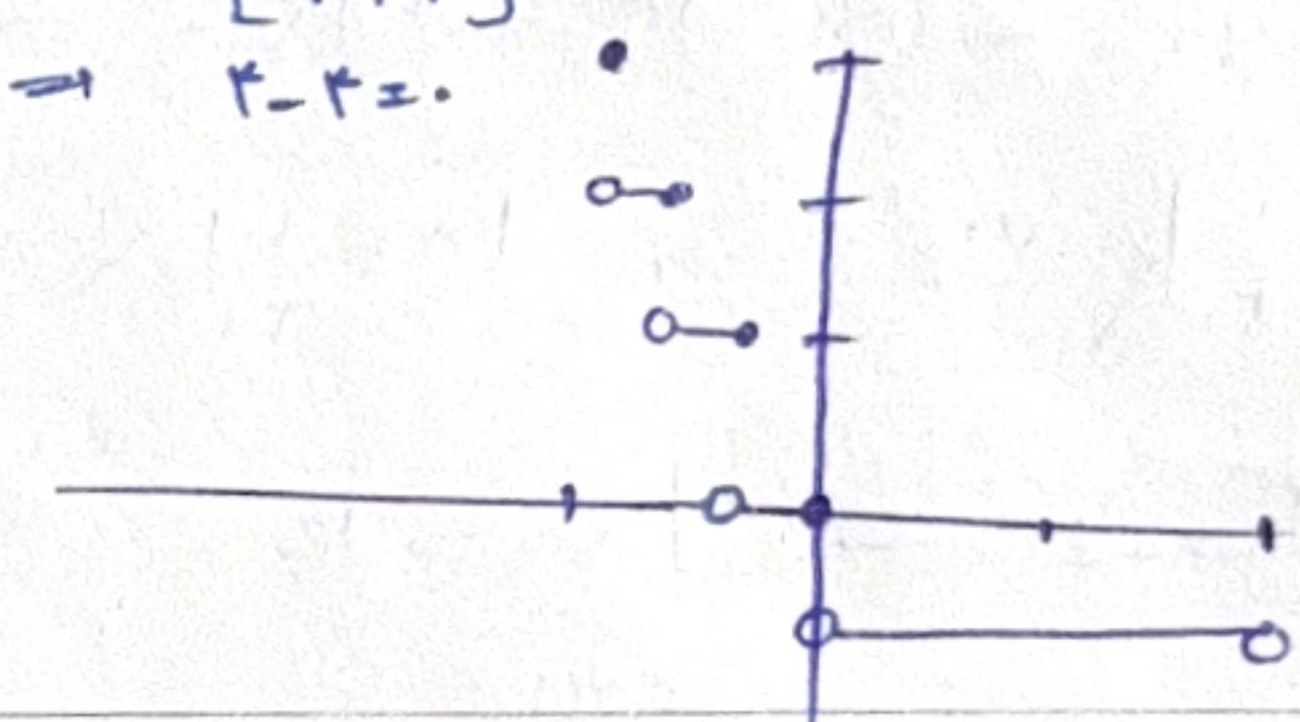
ب) $y=[x^2-2x] \quad x\in[-1,2]$

$x_s=\frac{-b}{2a}=1,\ y_s=-1$



if $x=-1 \Rightarrow [1+2]=3$

if $x=2 \Rightarrow 4-4=0$



۹

$a+[b]=4.2 \qquad a=x+0.2$

$b-[a]=2.4 \qquad b=y+0.4$

$a+b=?$

$a+[b]=4.2 \Rightarrow x+0.2+[y+0.4]=4.2$

$x+y+0=4 \Rightarrow x+y=4$ ①

$b-[a]=2.4$ ②

$y+0.4-[x+0.2]=y+0.4-x=2.4 \Rightarrow y-x=2$

①،② $\begin{cases} x+y=4 \\ y-x=2 \end{cases}$

$2y=6 \Rightarrow y=3 \Rightarrow x=1$

$a=1+0.2=1.2$

$b=3+0.4=3.4$ ⊕ $1.2+3.4=4.6$

۱۰

$(1+\sqrt{2})^6+(1-\sqrt{2})^6=198$ جزء صحیح → $(1+\sqrt{2})^6$

$(1+\sqrt{2})^6=198-(1-\sqrt{2})^6$

$1-1.4$ → عددی بین صفر و منفی ! → عددی بین صفر $\xrightarrow{\text{توان ۶}}$ و یک

$\Rightarrow (1+\sqrt{2})^6=198-0.1\ldots$

$(1+\sqrt{2})^6=197.\ldots$

$[(1+\sqrt{2})^6]=197$