Subject .... Date ....

ستایش عنبری یازدهم ریاضی

(1)

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

$\frac{1}{x-1} = x-1$; $x^2 - 2x = 0 \to x = 0$ ✗ , $\to x = 2$

$\frac{1}{x-1} = -x+1$; $-x^2 + 2x - 2 = 0$; $\Delta < 0$

فقط یک ریشه $x = 2$

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(2)

الف) $\frac{|2x-1|}{x} < 2$

$|2x-1| < 2|x|$

$(2x-1)^2 < 4x^2$

$-4x + 1 < 0$

$x > \frac{1}{4}$, $x \neq 0$

مجموعه جواب $\Rightarrow (\frac{1}{4}, +\infty)$

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

$|x-2| > |2x+1|$

$(x-2)^2 > (2x+1)^2$

$x^2 - 4x + 4 > 4x^2 + 4x + 1$

$3x^2 + 8x - 3 < 0 \to x = -3$, $x = \frac{1}{3}$

$2x + 1 \neq 0 \to x \neq -\frac{1}{2}$

مجموعه جواب $\Rightarrow (-3, -\frac{1}{2}) \cup (-\frac{1}{2}, \frac{1}{3})$

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(3)

$x^2 < |x+6|$; $|x - \alpha| < \beta$

$x + 6 > x^2 \longrightarrow x^2 - x - 6 < 0 \Rightarrow x = 3, x = -2 \longrightarrow$ $\begin{array}{ccccc} & -2 & & 3 & \\ + & 0 & - & 0 & + \end{array}$ $(-2, 3)$

$x + 6 < -x^2 \longrightarrow x^2 + x + 6 < 0 \to \Delta < 0 \to +$ همه $\to$ غ ق ق

$-2 < x < 3$ $\Rightarrow -\frac{5}{2} < x - \frac{1}{2} < \frac{5}{2} \Rightarrow |x - \frac{1}{2}| < \frac{5}{2} \longrightarrow \alpha = \frac{1}{2}$

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(4)

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

$x<-1$	$-1 \le x < 0$	$0 \le x < 2$	$x \ge 2$
$-(x+1) + 2x - (x-2) = 1$	$(x+1) + 2x - (x-2) = 2x+3$	$(x+1) - 2x - (x-2) = -2x+3$	$(x+1) - 2x + (x-2) = -1$
$\Rightarrow x = -1$	$x = 0$	$x = 2$	
$y = -2 + 3 = +1$	$y = 1 + 2 = 3$	$y = 3 - 4 = -1$	

$max + min = 3 - 1 = 2$

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(5)

$y = |\frac{1}{2}x| - 2 \longrightarrow y = \left|\frac{x+4}{2}\right| - 2 + 1 = \left|\frac{x+4}{2}\right| - 1 \Rightarrow |\frac{x}{2}| - 2 = \left|\frac{x+4}{2}\right| - 1$

$|\frac{x}{2}| = \left|\frac{x+4}{2}\right| + 1 \Rightarrow |x| = |x+4| + 1$; $x \geq 0 \longrightarrow x = x + 4 + 2 \longrightarrow 0 = 6$ غ ق ق

$-4 \le x < 0 \longrightarrow -x = x + 4 + 2 \longrightarrow x = -3$ ✓ ; $x < -4 \longrightarrow -x = -(x+4) + 2 \Rightarrow 0 = -2$ ✗

x کل برابر $= -3$

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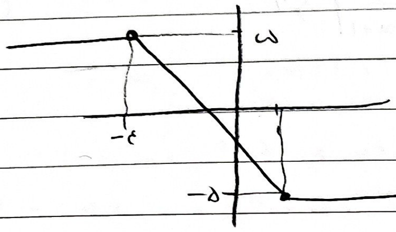
الف) $f(x)=[\,|1-x|-|x+4|\,]$

	-4		$+1$	
$1-x+x+4$		$1-x-x-4$		$x-1-x-4$
5		$-2x-3$		-5

$R_1=\{-5,-4,-3,-2,-1,0,1,2,3,4,5\}$



ب) $f(x)=\frac{1}{x}-\left[\frac{x+1}{x}\right]$

x	1	-2	-5	2
y	-5	5	5	-5

$\frac{1}{x}-\left[1+\frac{1}{x}\right]=\overbrace{\frac{1}{x}-\left[\frac{1}{x}\right]}^{[0,1)}-1$

$R_2=[-1,0)$

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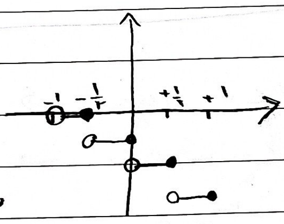
الف) $y=[-2x]-1 \quad x\in(-1,1)$

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

$-\frac{1}{2}<x\le0\to y=0-1=-1$

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

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

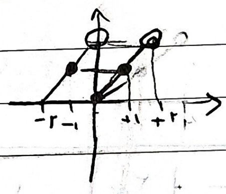


ب) $y=x-2\left[\frac{x}{2}\right]$

$x\in(-2,+2)$

$-2<x<0\to y=x-2(-1)=x+2$

$0\le x<2\to y=x-2(0)=x$



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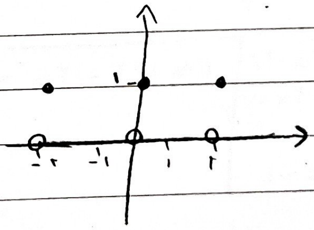
$y=[\,||x|-1|\,] \quad x\in[-2,+2]$

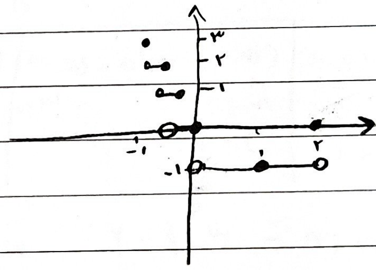
$0<x\le1\to y=0$

$1\le x<2\to y=0$

$x=2\to y=1$



ب) $y=[x^2-2x] \quad x\in[-1,2]$



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$a+(b-0.4)=6.2$

$b-(a-0.2)=2.4$

$a+b=1.2+3.4=\boxed{4.6}$ $a+b=?$

$b-[a]=2.4$ $\quad a+[b]=6.2$

$b-[a]=2.4$

$a+[b]=6.2$

$\to 2b=4.4+0.2=4.8$

$b=3.4 \quad a=1.2$

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$(1+\sqrt{2})^4+(1-\sqrt{2})^4=198$ $\quad$ جزء صحیح $B=(1+\sqrt{2})^4$ $\quad (1+\sqrt{2})^4+(1-\sqrt{2})^4=198$

$(1+\sqrt{2})^4=198-(1-\sqrt{2})^4\to -1<1-\sqrt{2}<0\to 0<(1-\sqrt{2})^4<1$

$[(1+\sqrt{2})^4]=[198-0.\ldots]=197$