شن ۲۰ «حسابان ۱» ۲۰ ستایش صفر

DATE / / SUBJECT: یازدهم دفتر

س۱: $|x-1| = \frac{1}{x-1} \rightarrow x-1 = \frac{1}{x-1} \rightarrow x^2-2x+\cancel{1} = \cancel{1} \rightarrow x^2-2x=0 \rightarrow x = 2 , 0$

$x-1 = \frac{1}{1-x} \rightarrow 2x - x^2 - 1 = 1 \rightarrow x^2-2x+2=0 \rightarrow \Delta < 0$ ریشه ندارد

$x=0 \rightarrow |-1| = \frac{1}{0-1} \rightarrow 1 \neq -1 \times \rightarrow -1 \neq 1$

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

$\boxed{x=2}$

۲

س۲: الف) $\left|\frac{2x-1}{x}\right| < 2$ $\qquad -2 < \frac{2x-1}{x} < 2$

$\frac{2x-1}{x} + 2 > 0 \rightarrow \frac{4x-1}{x} > 0$ $\qquad$ $0 \quad \frac{1}{4}$: $+ \quad - \quad +$

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

$\cap \; D_f = (\frac{1}{4}, +\infty)$

۲

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

$\frac{x-2}{2x+1} > 1 \rightarrow \frac{x-2}{2x+1} - 1 > 0 \rightarrow \frac{x-2-2x-1}{2x+1} > 0 \rightarrow \frac{-x-3}{2x+1} > 0$ $\qquad$ $-3 \quad -\frac{1}{2}$: $- \quad + \quad -$ $\rightarrow (-3, -\frac{1}{2})$

$\frac{x-2}{2x+1} < -1 \rightarrow \frac{x-2}{2x+1} + 1 < 0 \rightarrow \frac{3x-1}{2x+1} < 0 \rightarrow \frac{3x-1}{2x+1} < 0$ $\qquad$ $-\frac{1}{2} \quad \frac{1}{3}$: $+ \quad - \quad +$ $\rightarrow (-\frac{1}{2}, \frac{1}{3})$

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

س۳: $x^2 < |x+4| \rightarrow x^2 - x - 6 < 0$ $\qquad$ $, x^2 + x + 4 > 0 \rightarrow \Delta < 0 \rightarrow \mathbb{R}$

$x^2 - x - 6 = (x-3)(x+2) = 0$ $\qquad$ $-2 \quad 3$: $+ \quad - \quad +$ $\qquad D_f = [-2, 3]$

$-2 < x < 3 \rightarrow \frac{3-2}{2} = \frac{1}{2} \rightarrow |x - \frac{1}{2}| < 3 - \frac{1}{2} \rightarrow |x - \frac{1}{2}| < \frac{5}{2}$

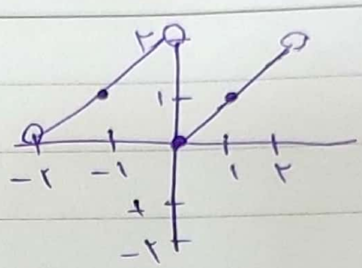
۲

$a = \frac{1}{2} \qquad b = \frac{5}{2}$

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

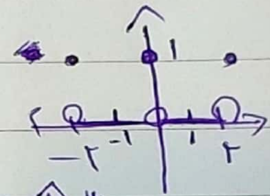
$-2 < x < 0 \to y = x - 2(-1) = x + 2$

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

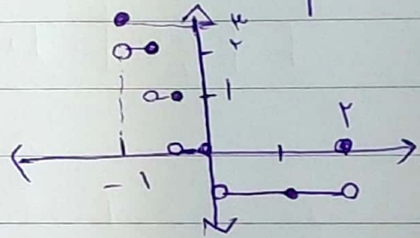


س۸) ۲

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



ج) $y = [x^2 - 2x]$ $\quad x \in [-1, 2]$



۲

س۹)

$a + (b - 0.6) = 4.2$

$b - (a - 0.2) = 2.6$

$2b = 6.6 + 0.2 = 6.8 \to b = 3.4$

$a = 1.2$

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

۲

س۱۰)

$(1+\sqrt{2})^4 + (1-\sqrt{2})^4 = 198$ $\qquad (1+\sqrt{2})^4 = 198 - (1-\sqrt{2})^4$

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

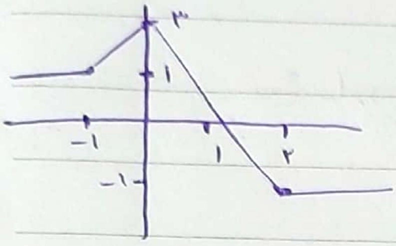
$197/...$

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

۲

س ۴:

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



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

$\max y=3 \quad \min y=-1$

$\max+\min=3-1=\boxed{2}$

(۲)

س ۵:

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

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

$|x|=|x+4|+2$

$x\geq 0 \to x=x+4+2 \to 0=6$ ✗

$-4\leq x<0 \to -x=x+4+2 \to x=-3$ ✓

$x<-4 \to -x=-(x+4)+2 \to 0=-2$ ✗

محل برخورد $=\{-3\}$

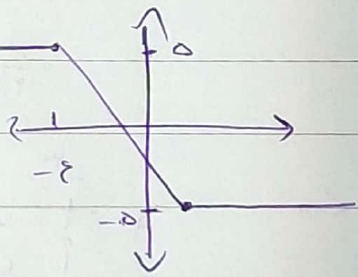
$|\frac{x}{2}|-2=|\frac{x+4}{2}|-1$

(۲)

س ۶:

الف) $f(x)=[|1-x|-|x+4|]$

x	1	-4	-5	2
y	-5	5	5	-5



با در نظر گرفتن براکت

(۲)

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

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

ب) $f(x)=\frac{1}{x}-[\frac{x+1}{x}]=\frac{1}{x}-[1+\frac{1}{x}]=\underbrace{\frac{1}{x}-[\frac{1}{x}]}_{[0,1)}-1 \Rightarrow R=[-1,0)$

س ۷:

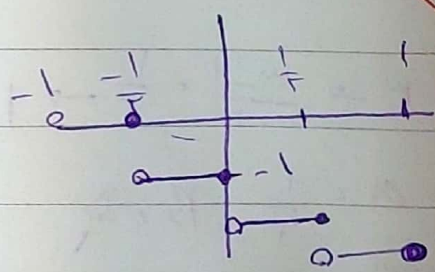
الف) $y=[-2x]-1 \quad x\in(-1,1)$

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

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

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

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



(۲)