فرانک آقایی   تکلیف شماره ۷   یازدهم تجربی

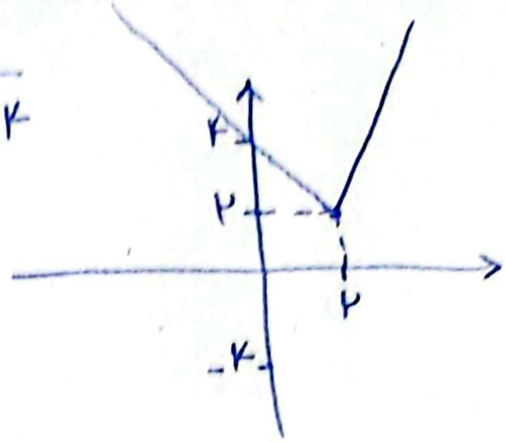
.1

الف) $y = x + |2x-4| \longrightarrow$

$-x+4$	$3x-4$

(split point: 2, value: 2)

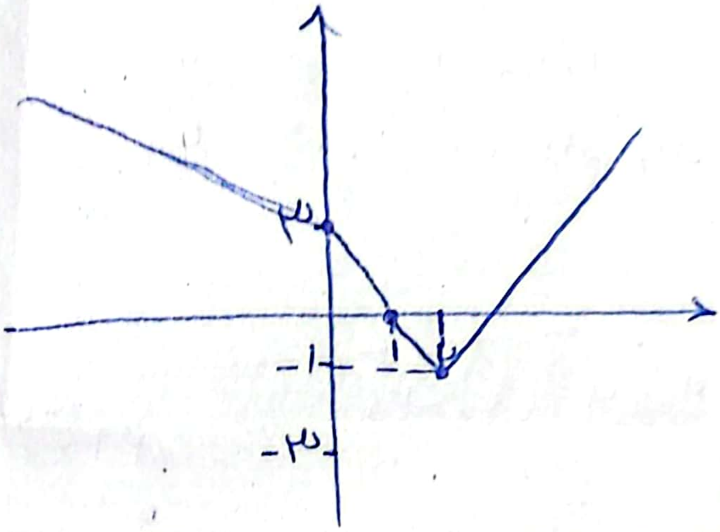
$R_f = [2, +\infty)$



ب) $y = |x-2| + |x-1| - |x|$

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

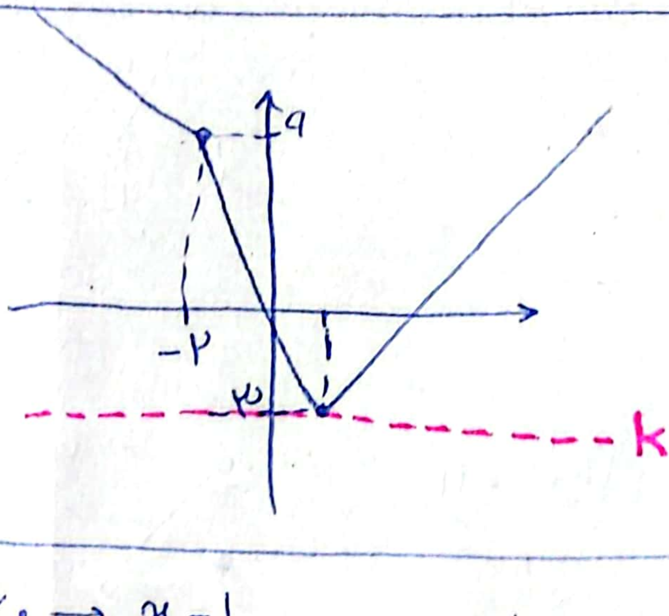
$R_f = [-1, +\infty)$



.2

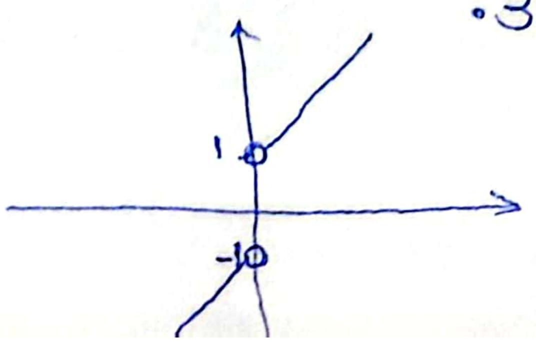
x		-2		1	
	$-2x+5$		$-4x-1$		$2x-5$
		9		-3	

$\boxed{k=-3} \longrightarrow$ چون فقط یک ریشه دارد

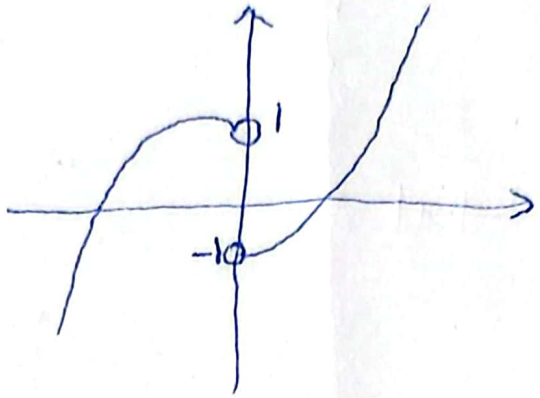


.3

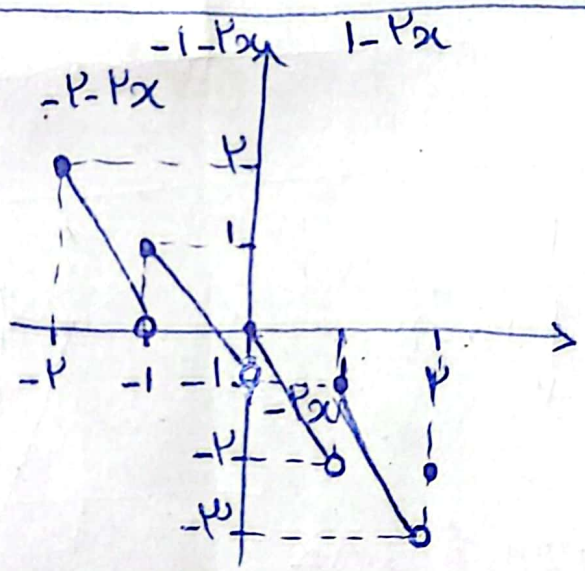
الف) $y = x + \dfrac{x}{|x|} \longrightarrow \begin{cases} x<0 \to x-1 \\ x>0 \to x+1 \end{cases}$



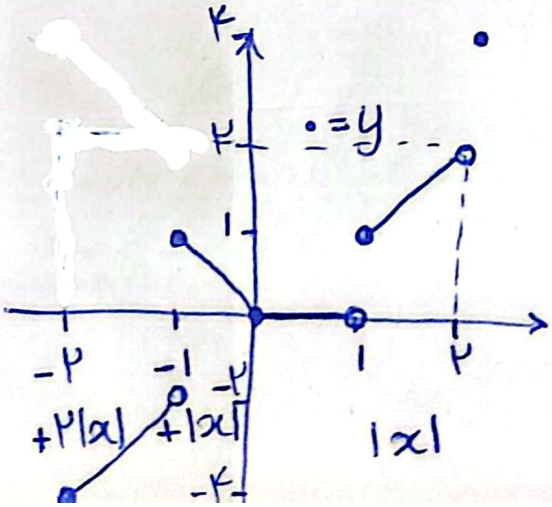
ب) $y = x|x| - \frac{x}{|x|} \longrightarrow \begin{cases} x<0 \longrightarrow y = -x^2 + 1 \\ x>0 \longrightarrow y = x^2 - 1 \end{cases}$



الف) $y = [x] - 2x$ .4



ب) $[x]|x| = y$



.5

الف) $y = 3x - [3x] \longrightarrow 0 \leq x - [x] < 1 \longrightarrow Rf = [0, 1)$

ب) $y = 4x - 4[x] \longrightarrow 4(x - [x]) \longrightarrow Rf = [0, 4)$

ج) $y = x - 5[\frac{x}{5}] \rightarrow 5(\frac{x}{5} - [\frac{x}{5}]) = y \longrightarrow Rf = [0, 5)$

د) $y = [2x] - 2x \rightarrow (2x - [2x]) = y \longrightarrow Rf = (-1, 0]$

.6

الف) $y = 3\sin x + 2\cos x \longrightarrow -\sqrt{9+4} \leq 3\sin x + 2\cos x \leq \sqrt{13}$

$Rf = [-\sqrt{13}, \sqrt{13}]$

ب) $-\sqrt{16+9} = -\sqrt{25} = -5 \longrightarrow Rf = [-5, +5]$

ج) $-\sqrt{4+25} = -\sqrt{29} \leq [\quad] \leq \sqrt{29} \longrightarrow [3\sin x + 5\cos x] =$

$-5 / -$ $\quad$ $5 / -$

$-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5$

$Rf = \{-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$

د) $-\sqrt{5} \leq \quad \leq \sqrt{5} \longrightarrow Rf = [0, \sqrt{5}]$

.7

الف) $y = \sin^2 x + 3\sin x + 2 \longrightarrow \frac{-b}{2a} = \frac{-3}{2} \rightarrow f(-\frac{3}{2}) = -\frac{1}{4}$

$f(1) \longrightarrow 6$ $\quad$ $\frac{1}{4}$

$f(-1) \longrightarrow 0$ $\quad$ $[-\frac{1}{4}, 6] = Rf$

ب) $y = 2\sin^2 x + 3\sin x + 2 \longrightarrow \frac{-b}{2a} = \frac{-3}{4} \rightarrow f(\frac{-3}{4}) = \frac{7}{8}$

$f(1) \longrightarrow 2 + 3 + 2 = 7$ $\quad$ $\frac{7}{8}$ $\quad$ 7

$f(-1) \longrightarrow 2 - 3 + 2 = 1$ $\quad$ $[\frac{7}{8}, 7] = Rf$

8. الف) $(\sin^2 x + \cos^2 x) = 1 + \underbrace{3\cos^2 x}_{[0,3]} \rightarrow Rf = \underbrace{[1,4]}$

ب) $\frac{2\cot x}{\underbrace{1+\cot^2 x}_{\frac{1}{\sin^2 x}}} \Rightarrow \underbrace{2\cos x \sin x}_{\sin(2x)} \rightarrow Rf = [-1,1]$

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9. $y = \sin^4 x + \cos^4 x \longrightarrow 2^{1-2} \leq \sin^{4x} + \cos^{4x} \leq 1 \rightarrow$

$2^{-2} = \frac{1}{4}$

$Rf = [+\frac{1}{4}, 1]$

ب) $y = [\sin^2 x + \cos^2 x] \longrightarrow 2^{1-2} \leq [\sin^2 x + \cos^2 x] \leq 1 \rightarrow$

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

$Rf = \{0, 1\}$

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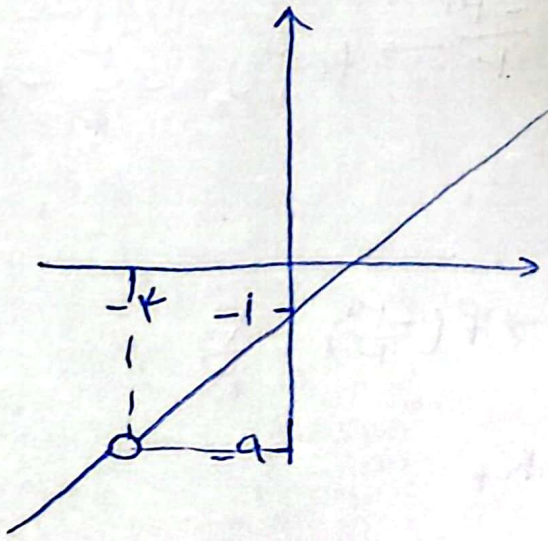
10. الف) $x^2 + 3x - 2 \rightarrow (x+2)(x-1) \xrightarrow{\div 2} \frac{(x+2)(2x-1)}{x+2} \rightarrow x \neq -2$



$2(-2) - 1 = -9$

$\rightarrow R - \{-9\} = Rf$

$$y = \frac{x^3 - 1}{x - 1} = \frac{(x-1)(x^2+x+1)}{x-1} \longrightarrow \frac{-b}{2a} = \frac{-1}{2} \rightarrow y = \frac{3}{4}$$

$x \neq 1 \rightarrow x = 1 \rightarrow y = 3$

$Rf = [\frac{3}{4}, +\infty)$