بنام خداوند دانش

شماره تکلیف : ۲

Subject : (ریاضی دهم)

Date:

۱۹,۲۵

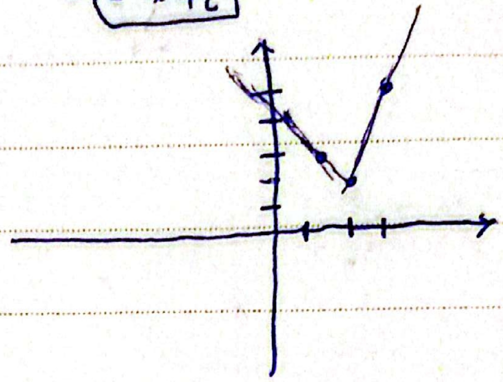
① (۳)

الف) $y = x + |2x-4|$

$3x-4 = x + 2x - 4$ | $x - 2x + 4$

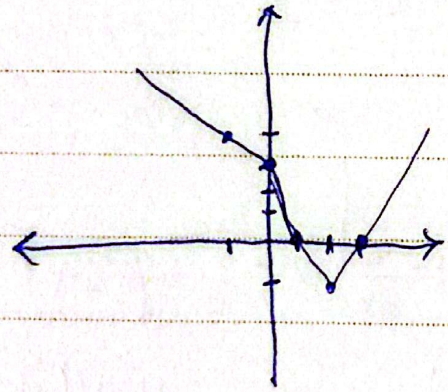
$= -x+4$

x	۱	۲	۳
y	۳	۲	۵



$R_f = [2, +\infty)$

ب) $y = |x-2| + |x-1| - |x|$



	۰		۱		۲	
$-x+2-x+1+x$		$-x+2-x+1-x$		$-x+2+x-1-x$		$x-2+x-1-x$
$= -x+3$		$= -3x+3$		$= -x+1$		$= x-3$

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

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

$y = -(-1) + 3 = 2$

$x = -1$

② (۳)

$|3x-3| - |x+2| = k$

x	-3	-2	۱	۲
y	۱۱	۹	-3	-1

	-2		۱	
$-3x+3+x+2$		$-3x+3-x-2$		$3x-3-x-2$
$= -2x+5$		$= -4x+1$		$= 2x-5$

Arman

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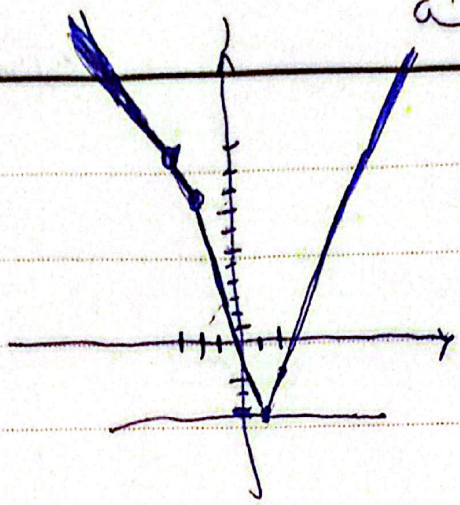


$k = -3$

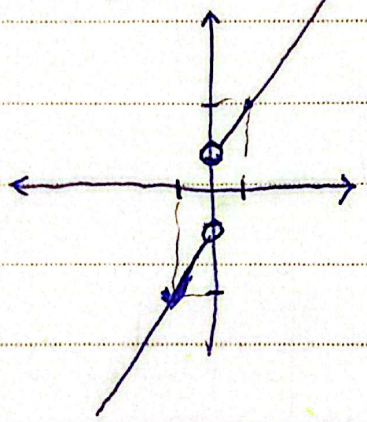
$R_f = [-3, +\infty)$

(۴)

الف) $y = x + \frac{x}{|x|}$

$x + \frac{x}{x} = x + 1$

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



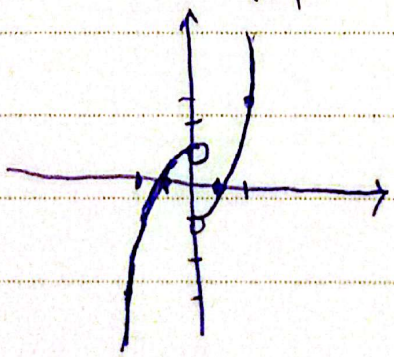
x	-1	1	0
y	-2	2	نـ

$R_f = \mathbb{R} - [-1, 1]$

ب) $y = x|x| - \frac{x}{|x|}$

$x(-x) - \frac{x}{-x} = -x^2 + 1$

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



x	0	1	2	-1	-2
y	0	0	3	0	-3

نـ

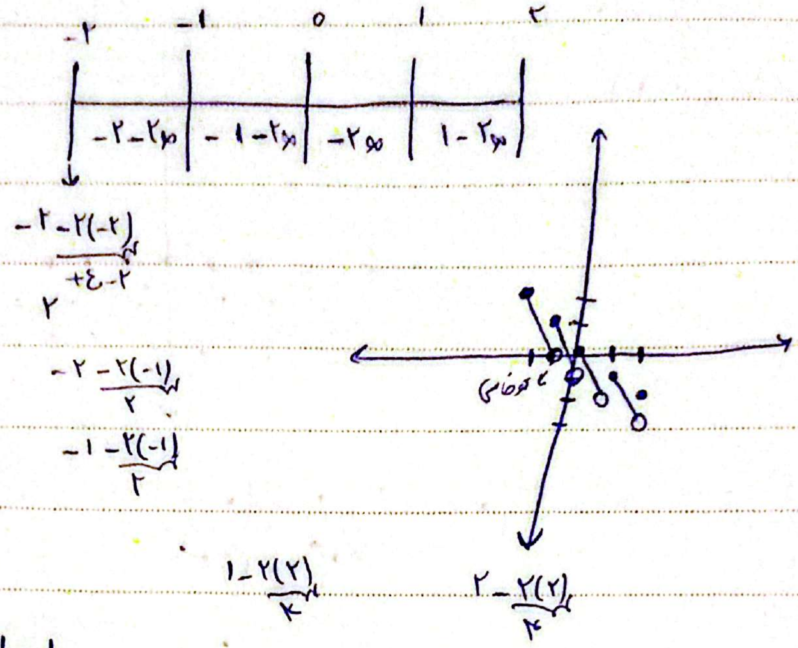
$1 \quad -1$

$R_f = \mathbb{R}$

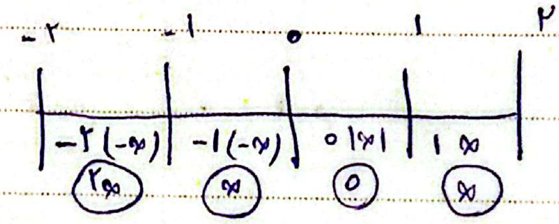
Arman

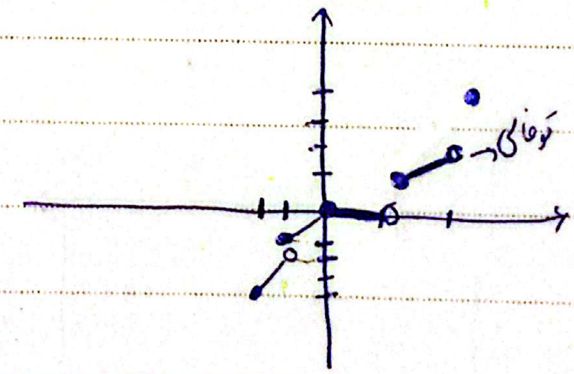
۴) $[-2, 2]$

الف) $y = [x] - 2x$



ب) $y = [x]\,|x|$





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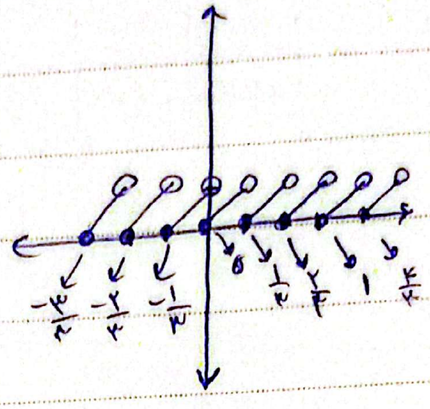
۵) برد

$۳x = x'$

الف) $y = ۳x - [۳x]$

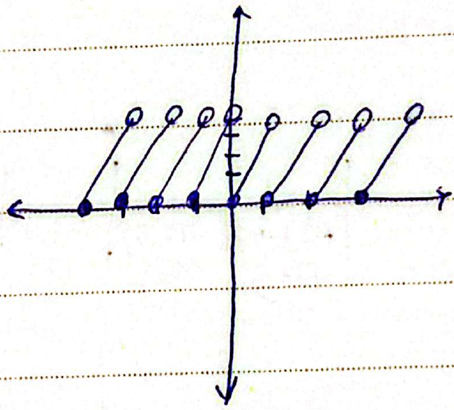
$x' - [x']$

$R_f = [0,1)$



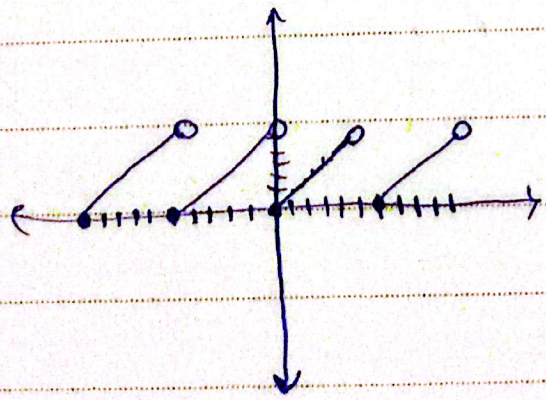
ب) $y = ۴x - ۴[x] = ۴(x - [x]) \Rightarrow R_f = [0,۴)$

$[0,1)$



ج) $y = x - ۵\left[\frac{x}{۵}\right]$

	-۵		0		۵		۱۰
		$[\frac{x}{۵}] = -1$		$[\frac{x}{۵}] = 0$		$[\frac{x}{۵}] = 1$	۲
		$x + ۵$		x		$x - ۵$	$x - ۱۰$



$R_f = [0,۵)$

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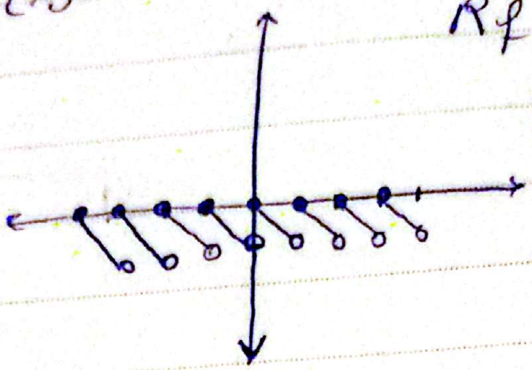
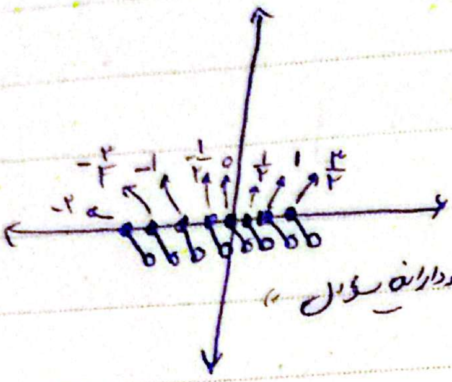
د) $y = [2x] - 2x = [x'] - x'$ $\qquad R_f = (-1, 0]$

$[x] - x$

$2x = x'$





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$$-\sqrt{a^2+b^2} \le a\sin x + b\cos x \le \sqrt{a^2+b^2}$$

الف) $y = 3\sin x + 2\cos x$ $\qquad R_f = [-\sqrt{13}, \sqrt{13}]$

$-\sqrt{3^2+2^2} \le \qquad \le \sqrt{9+4} = \sqrt{13}$

$9+4$

ب) $y = 4\sin x - 3\cos x$ $\qquad R_f = [-5, 5]$

$-\sqrt{4^2+(-3)^2} \le \qquad \le \sqrt{25} = 5$

$16+9$

$-\sqrt{25}$

ج) $y = [2\sin x + 5\cos x]$

$-\sqrt{2^2+5^2} \le 2\sin x + 5\cos x \le \sqrt{29}$

$25+4$

$[2\sin x + 5\cos x]$

$[-\sqrt{29}] \le \qquad \le [\sqrt{29}] \Rightarrow R_f =$

$-5, \ldots \qquad 5, \ldots \qquad \{-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$

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ج) $y = \sqrt{\cos x - 2\sin x}$

$-\sqrt{1^2+(-2)^2} \le \cos x - 2\sin x \le \sqrt{5}$

$-\sqrt{5} \le \cos x - 2\sin x \le \sqrt{5}$

$R_f = [0, \sqrt{5}]$

الف) $y = \sin^2 x + 2\sin x + 2$ (۷)

$\sin x = -1 \Rightarrow y = (-1)^2 + 2(-1) + 2 = 0$

$\sin x = 1 \Rightarrow y = (1)^2 + 2(1) + 2 = 5$

$\sin x = \frac{-b}{2a} = \frac{-2}{2}$

$y = \left(\frac{-2}{2}\right)^2 + 2\left(\frac{-2}{2}\right) + 2$

$= \frac{9}{4} + \frac{-9}{4} + 2 = -\frac{1}{4}$

$R_f = [-\frac{1}{4}, 5]$

۱٫۵

ب) $y = 2\sin^2 x + 2\sin x + 2$

$\sin x = 1 \Rightarrow \frac{2(1)^2}{2} + 2(1) + 2 = 6$

$\sin x = -1 \Rightarrow 2(-1)^2 + 2(-1) + 2 = 2$

$\sin x = \frac{-b}{2a} = \frac{-2}{4}$

$2\left(\frac{-2}{4}\right)^2 + 2\left(\frac{-2}{4}\right) + 2$

$\frac{9}{16} \times 2 \quad \frac{-9}{4} \times 2$

$\frac{9}{8} \quad -\frac{9}{8} + \frac{16}{8} = \frac{7}{8}$

$R_f = [\frac{7}{8}, 6]$

①

الف) $y = \sin^2 x + \frac{4\cos^2 x}{1-\sin^2 x}$

$\sin^2 x + 4 - 4\sin^2 x = -3\sin^2 x + 4$

$[0,1]$

$[-3,0] + 4 \Rightarrow Rf = [1,4]$

ب) $y = \frac{2\cot x}{1+\cot^2 x} = \frac{\frac{2\cos x}{\sin x}}{\frac{1}{\sin^2 x}} = 2\cos x \sin x$

$1+\cot^2 x = \frac{1}{\sin^2 x}$

$= \sin 2x$

$Rf = [-1,1]$

②

الف) $y = \sin^4 x + \cos^4 x$

$2^{2-k} \leq \sin^{2k} x + \cos^{2k} x \leq 1$ ($2k \to 4$)

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

$Rf = [\frac{1}{2}, 1]$

ب) $y = [\sin^8 x + \cos^8 x]$

$Rf = [0,1]$

$2^{1-4} = 2^{-3} = \frac{1}{8} \leq \sin^8 x + \cos^8 x \leq 1$

$[\frac{1}{8}] \leq [\sin^8 x + \cos^8 x] \leq [1] = 1$

$[\frac{1}{8}] = 0$

$\hookrightarrow R = \{0,1\}$

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الف) $y = \frac{2x^2+7x-4}{x+4}$

$(2x^2+7x-4)\times 2$

$= 4x^2 + 14x - 8$

$2(7x)$

$\frac{(2x+8)(2x-1)}{2} = (x+4)(2x-1)$

$\frac{(x+4)(2x-1)}{x+4}$

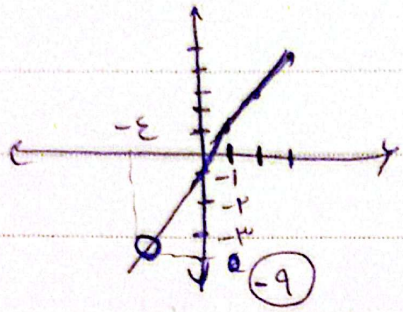
$2x-1 = 0$

$x = -4$

$y = 0 = 0$

$2(-4)-1 = -9$

-8



$R_f = \mathbb{R} - \{-9\}$

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

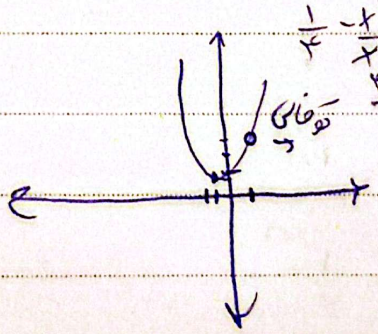
$y = (\frac{-1}{2})^2 - \frac{1}{2} + 1$

$\frac{1}{4} - \frac{2}{4} + \frac{4}{4}$

$\frac{3}{4}$

$x = 1 = 0$

$y = (1)^2+1+1 = 3$



$R_f =$

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

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