

19, 75

علی ملازبان / تلف 05 / ملازم 1

الف) $y = \frac{|x|+1}{|x|-2}$ $\begin{matrix} a+b \\ c+d \end{matrix} \begin{matrix} \text{max} \\ \text{min} \end{matrix} \frac{|x|}{|x|} = 1 \xrightarrow{\text{فرم منفرجه}} R_f = (-\infty, -\frac{1}{3}] \cup (1, +\infty)$ (2)

ب) $\frac{x^2+1}{|x|} \Rightarrow |x| + \frac{1}{|x|} \Rightarrow R_f = [2, +\infty)$

$g = \frac{x^2+2x-2}{x+3} \Rightarrow yx+3y = x^2+2x-2 \Rightarrow x^2+(2-y)x-3y-2$

$\Rightarrow \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \Delta \geq 0 \rightarrow y^2-4y+4+12y+4 \geq 0 \Rightarrow y^2+8y+8 \geq 0$

$\Rightarrow (y+4)(y+2) \geq 0 \Rightarrow \frac{-4}{+4} \frac{-2}{-4} \Rightarrow R_f = (-\infty, -6] \cup [-2, +\infty)$

فرض کنیم متغیر جدید یغنا 1 و 4 است

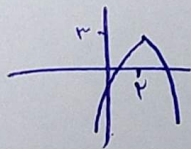
تابع در ازای هیچ مقداری برابر یک همیشه پس بره برابر است: $f(x) = \frac{x^2-x+\frac{1}{x}}{x^2-x+1}$ $\begin{cases} R_f = R \text{ (مخرج منفرجه)} \\ R_f = R_y = [0, 1) \end{cases}$ $R_f \Rightarrow y = \frac{x^2-x+\frac{1}{x}}{x^2-x+1} \Rightarrow yx^2 - yx + y = x^2 - x + \frac{1}{x}$ (1, 75)

می‌توانست از روش مربع هم استفاده کنی

$\Rightarrow x^2(1-y) + x(y-1) + \frac{1}{x} - y \geq 0 \Rightarrow y^2-2y+1-4y^2+4y-1 \geq 0 \Rightarrow -3y^2+2y \geq 0 \Rightarrow -2(y^2-\frac{2}{3}y) \geq 0 \Rightarrow 0 \leq y \leq \frac{1}{3}$ $\Rightarrow R_f = [\frac{1}{3}, +\infty)$ $\frac{f'(x) = \frac{0^2}{x^2} + \frac{0^2}{x^2}}{x^2 + \frac{0^2}{x^2}}$

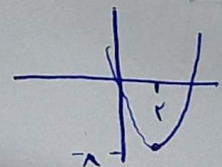
الف) $y = \sqrt{-x^2+2x-1}$

$R_f = [0, \sqrt{2}]$



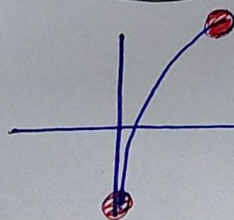
ب) $y = \sqrt{x^2-2x}$

$R_f = [0, +\infty)$



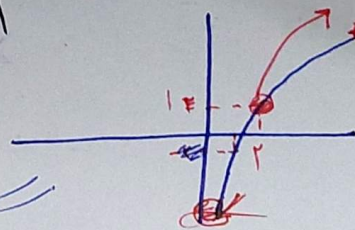
الف) $y = g(x^2-x+1)$ $R_f = R$

$R_f = R$



ب) $y = g(\frac{x^2+1}{x})$

$x + \frac{1}{x} \rightarrow [2, +\infty) \cup (-\infty, -2]$



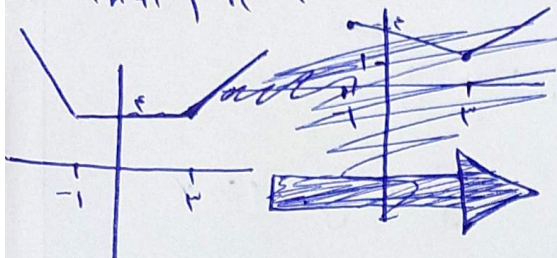
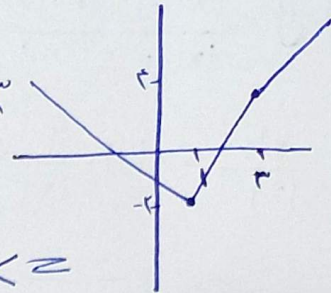
$R_f = [1, +\infty)$

ca) $y = |2x-1| - |x-1|$

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

x	$-x+1$	$x-1$	$x-1-x+1$
$x < -1$	$-x+1$	$1-x$	$-x+1-1+x = 0$
$-1 \leq x < 1$	$-x+1$	$x-1$	$-x+1-x+1 = 2-2x$
$x \geq 1$	$x-1$	$x-1$	$x-1-x+1 = 0$

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



$R_f = [1, +\infty)$

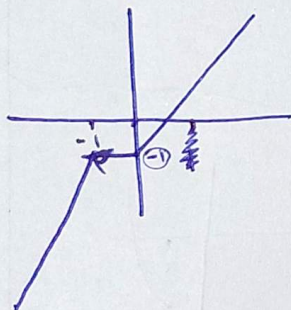
$|x-1| - |2x+1| \leq 1$

$(-\infty, -1] \cup [-\frac{1}{2}, +\infty)$

x	$-x+1$	$x-1$	$x-1-2x-1$
$x < -1$	$-x+1$	$1-x$	$-x+1-1+x = 0$
$-1 \leq x < -\frac{1}{2}$	$-x+1$	$x-1$	$-x+1-x-1 = -2x$
$-\frac{1}{2} \leq x < 1$	$x-1$	$x-1$	$x-1-x-1 = -2$
$x \geq 1$	$x-1$	$x-1$	$x-1-x-1 = -2$

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

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



$\Rightarrow R_f = \mathbb{R}$

x	$2x$	$-2x-1$	x
$x < -1$	$2x$	$-2x-1$	$2x-2x-1-x = -1-x$
$-1 \leq x < 0$	$2x$	$x-1$	$2x-x-1-x = -1$
$x \geq 0$	$2x$	$x-1$	$2x-x-1+x = x-1$

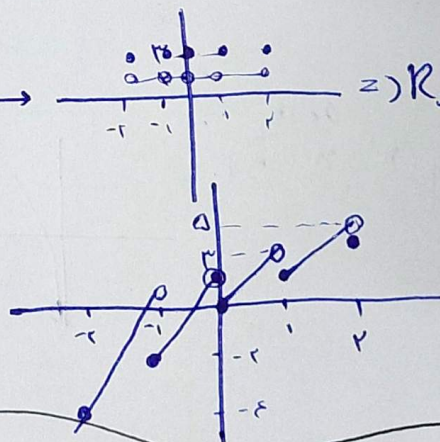
$\Rightarrow R_f = \mathbb{R}$

ca) $y = [x] + [x-1] = [x] + [-x] + 1 \rightarrow R_f = \{1, 2\}$

1) $y = 2x - [x]$

$R_f = [-1, 1]$

$\begin{cases} [1, 2) = 2x-1 \\ [0, 1) = 2x \\ [-1, 0) = 2x+1 \\ [-2, -1) = 2x+2 \end{cases}$



ca) $y = \sin^2 x - \sin x + 1$

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

1) $y = \sin^2 x + \sin^2 x + 1$

$\Rightarrow R_f = [1, 2]$