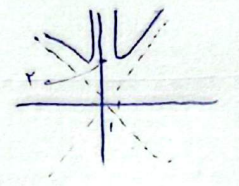


الف) $y = \frac{|n|+1}{|n|-2}$ $y \rightarrow |n| = \frac{-y-1}{y-1} = \frac{y+1}{y-1} \geq 0$ $\frac{-\frac{1}{y}}{+\frac{1}{y}-\frac{1}{y}+} \rightarrow R_f: (-\infty, \frac{1}{2}] \cup (1, +\infty)$

$y = \frac{n^2+1}{|n|} \rightarrow \frac{n^2+1}{-n} \mid \frac{n^2+1}{n} = n \pm \frac{1}{n}$  $R_f: [2, +\infty)$

$y = \frac{n^2+2n-2}{n+5} \rightarrow n^2+2n-2 = yn + 5y$
 $n^2 + (2-y)n - 2-5y = 0 \rightarrow n = \frac{-(2-y) \pm \sqrt{\Delta}}{2} \rightarrow \Delta \geq 0$

$\rightarrow (2-y)^2 + 4(2+5y) \geq 0$
 $y^2 - 4y + 8 + 10y \geq 0 \rightarrow y^2 + 6y + 8 \geq 0$
 $(y+2)(y+4) \geq 0$
 $R_f: (-\infty, -4] \cup [-2, +\infty)$

$f(n) = \frac{n^2-n+\frac{1}{2}}{n^2-n+1}$ $D_f: n^2-n+1 \neq 0 \rightarrow D_f: \mathbb{R}$

$\hookrightarrow \frac{(n-\frac{1}{2})^2}{n^2-n+\frac{1}{2}+\frac{1}{2}} = \frac{(n-\frac{1}{2})^2}{(n-\frac{1}{2})^2+\frac{1}{2}} = y \rightarrow (n-\frac{1}{2})^2 = \frac{\frac{1}{2}y}{y-1} = \frac{-\frac{1}{2}y}{y-1} \geq 0$ $R_f: [0, 1)$

الف) $y = \sqrt{-n^2+8n-1} \rightarrow \frac{-\Delta}{2a} = \frac{-(14-8)}{-2} = 3$
 $R_f: [0, 3]$

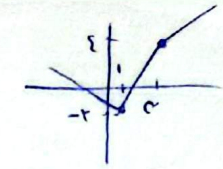
ب) $y = \sqrt{n^2-1}n \rightarrow \min \left| \frac{-\Delta}{2a} : \frac{-4}{1} = -1 \rightarrow \sqrt{[-1, +\infty)} \Rightarrow R_f: [-1, +\infty)$

الف) $y = f_y(\underbrace{n^2-n+1}_{R_f: \mathbb{R}}) = f_y^{\mathbb{R}} \mid R_f: \mathbb{R}$
 $(f_y(\cdot, \cdot)) \in \mathbb{R}$

$\rightarrow y = f_y(\frac{n^2+1}{n}) \rightarrow n \pm \frac{1}{n} \in \underbrace{(-\infty, -2] \cup [2, +\infty)}_{\text{مستثنی}} \rightarrow f_y: [2, +\infty) \mid R_f: [1, +\infty)$

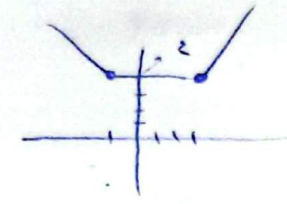
الف) $y = |x-2| - |x-1|$

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



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

ب) $y = |x-2| + |x+1|$

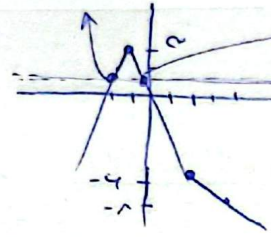


$R_f: [1, +\infty)$

ج) $|x-2| - |x+2| \leq 1$

$x=2 \rightarrow y=-4$
 $x=5 \rightarrow 2-1=-1, y$
 $x=-1 \rightarrow y=3$
 $x=-2 \rightarrow 4-2=2$

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

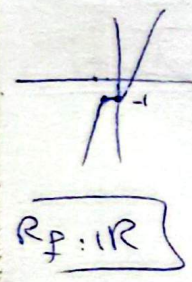


$-x+2+x+2$ $= x+4$	$-x+2-x-2$ $= -2x$	$x-2-x-2$ $= -x-4$
-1	2	

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

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

د) $y = x - |x+1| + |x|$



$R_f: \mathbb{R}$

$x+x+1-x$
 $y = x+1$
 $R_f: x \leq -\frac{1}{2}$
 $x \leq -1$
 $x+1 \leq -1$
 $(-\infty, -1]$

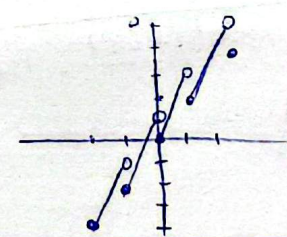
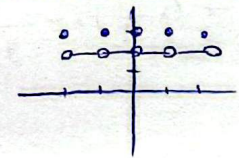
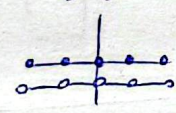
$-\frac{1}{2}$

$x-x-1-x$
 $= -1$
 $y = -1$
 $R_f: x > -\frac{1}{2}$

0

$x-x-1+x$
 $y = x-1$
 $R_f: x > 0 \rightarrow x, x-1 > -1$
 $R_f: [-1, +\infty)$

هـ) $y = [x] + x + [-x] = [x] + [-x] + x$



ب) $y = x - [x]$
 $-1 \leq x < 0 \rightarrow [x] = -1 : x+1$
 $0 \leq x < 1 \rightarrow [x] = 0 : x$
 $1 \leq x < 2 \rightarrow [x] = 1 : x-1$
 $x=2 \rightarrow : x-2$

و) $y = \sin^2 x - \sin x + 1$

$\sin x = -1 \rightarrow y = 1 + 1 + 1 = 3$
 $\sin x = 1 \rightarrow 1 - 1 + 1 = 1$
 $\sin x = \frac{1}{2} \rightarrow \frac{1}{4} - \frac{1}{2} + 1 = \frac{3}{4}$

$R_f: [\frac{3}{4}, 3]$

ز) $y = \sin^2 x + \sin x + 1$

$\sin x = 0 \rightarrow y = 1$
 $\sin x = 1 \rightarrow y = 3$
 $\sin x = -\frac{1}{2} \rightarrow \frac{1}{4} - \frac{1}{2} + 1 = \frac{3}{4}$

$R_f: [1, 3]$