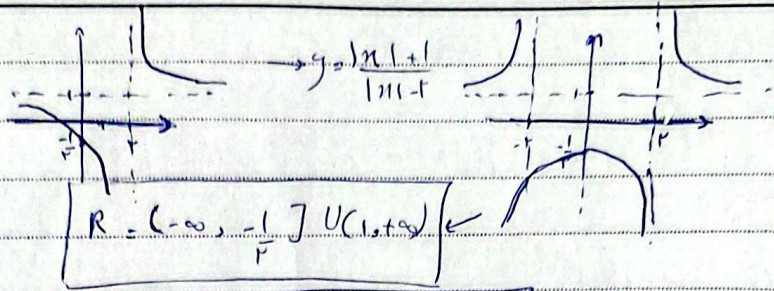


الف) $y = \frac{x+1}{x-2}$
 $x=0 \Rightarrow y = -\frac{1}{2}$
 نقطة تقاطع: $x=2, y=1 \rightarrow x=2$
 جانب آخر: $x=0$



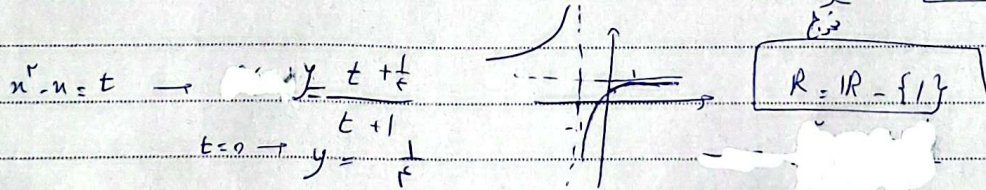
ب) $y = \frac{|x|^2+1}{|x|} = |x| + \frac{1}{|x|}$, $|x| \geq 1$, $R = [1, +\infty)$

$y = \frac{x^2+2x-2}{x+3} \rightarrow yx + 3y = x^2+2x-2 \rightarrow x^2 + (2-y)x - 2-3y = 0$

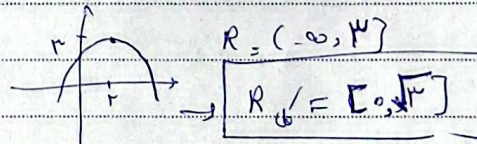
$b^2 \geq 4ac \rightarrow (2-y)^2 \geq 4(-2-3y) \rightarrow y^2 + 4 - 4y + 8 + 12y \geq 0$
 $-4(2+3y)$

$\rightarrow y^2 + 4 - 4y + 8 + 12y \geq 0 \rightarrow y^2 + 8y + 12 \geq 0 \rightarrow (y+4)(y+2) \geq 0$
 $R = (-\infty, -4] \cup [-2, +\infty)$

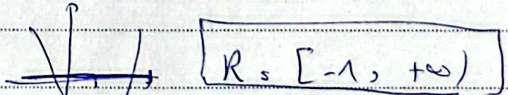
ج) $x^2-x+1 \neq 0 \rightarrow b^2-4ac = 1-4 = -3 < 0 \rightarrow$ لا توجد جذور $D = \mathbb{R}$



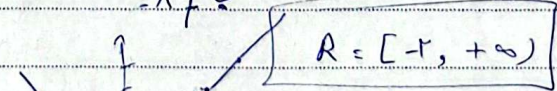
د) $\lim_{x \rightarrow -1} \left| \frac{-\frac{b}{2a} - (-1)}{-\frac{b}{2a} + 1 - 1} \right| = \frac{-\frac{1}{2} - (-1)}{-\frac{1}{2} + 1 - 1} = \frac{-\frac{1}{2} + 1}{-\frac{1}{2}} = \frac{\frac{1}{2}}{-\frac{1}{2}} = -1$



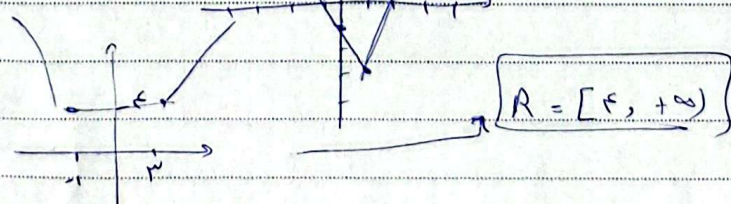
هـ) $\lim_{x \rightarrow -1} \left| \frac{-\frac{b}{2a} - (-1)}{-\frac{b}{2a} + 1 - 1} \right| = \frac{-\frac{1}{2} - (-1)}{-\frac{1}{2} + 1 - 1} = \frac{-\frac{1}{2} + 1}{-\frac{1}{2}} = \frac{\frac{1}{2}}{-\frac{1}{2}} = -1$



و) $\lim_{x \rightarrow -1} \left| \frac{-\frac{b}{2a} - (-1)}{-\frac{b}{2a} + 1 - 1} \right| = \frac{-\frac{1}{2} - (-1)}{-\frac{1}{2} + 1 - 1} = \frac{-\frac{1}{2} + 1}{-\frac{1}{2}} = \frac{\frac{1}{2}}{-\frac{1}{2}} = -1$



ز) $\lim_{x \rightarrow -1} \left| \frac{-\frac{b}{2a} - (-1)}{-\frac{b}{2a} + 1 - 1} \right| = \frac{-\frac{1}{2} - (-1)}{-\frac{1}{2} + 1 - 1} = \frac{-\frac{1}{2} + 1}{-\frac{1}{2}} = \frac{\frac{1}{2}}{-\frac{1}{2}} = -1$



ا) $y = \log(x^2 - x + 1)$ $\rightarrow R = \mathbb{R}$

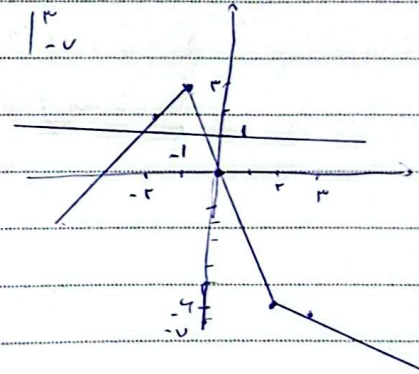
ب) $\frac{x^2+1}{x} = x + \frac{1}{x} \rightarrow R = (-\infty, -1] \cup [1, +\infty) \rightarrow R = [1, +\infty)$

$y = |x-2| - |x+2| \leq 1$ $\begin{cases} x \leq -2 \\ -2 \leq x \leq 2 \\ x \geq 2 \end{cases}$

$x \leq -2 \rightarrow -x+2+x+2 = x+4 = 1 \rightarrow x = -3$

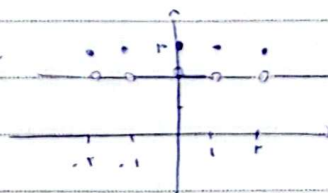
$-2 \leq x \leq 2 \rightarrow -x+2-x-2 = -2x = 1 \rightarrow x = -\frac{1}{2}$

جواب: $(-\infty, -3] \cup [-\frac{1}{2}, +\infty)$



$3x + 2x + 1 - x = 4x + 1$ $\begin{cases} x < -1 \\ -1 \leq x < 1 \\ x \geq 1 \end{cases}$ $R = (-\infty, -1]$

ا) $y = [x] + [-x] + x$



$R = \{x, x\}$

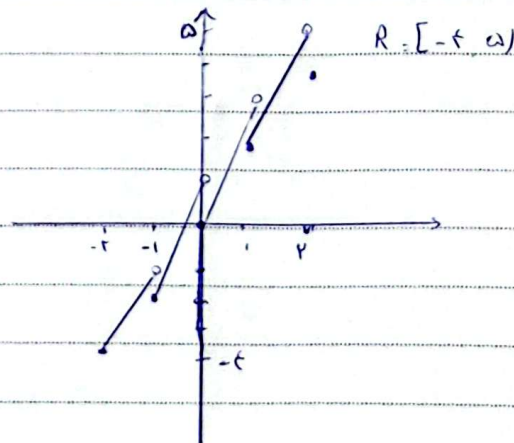
ب) $-2 \leq x < 1 \rightarrow [x] = -2 \rightarrow y = 3x + 2$

$-1 \leq x < 0 \rightarrow [x] = -1 \rightarrow y = 3x + 1$

$0 \leq x < 1 \rightarrow [x] = 0 \rightarrow y = 3x$

$1 \leq x < 2 \rightarrow [x] = 1 \rightarrow y = 3x - 1$

$x = 2 \rightarrow [x] = 2 \rightarrow y = 3x - 2$



ا) $\frac{b}{a} \leq \frac{1}{x} \rightarrow \frac{1}{x} - \frac{1}{x} + 1 = -\frac{1}{x} + 1 = \frac{x-1}{x}$

$R = [\frac{x}{x}, \frac{x}{x}]$

ب) $\frac{1}{x} = \frac{1}{x} \rightarrow \sin x = \frac{1}{x}$

$R = [1, x]$