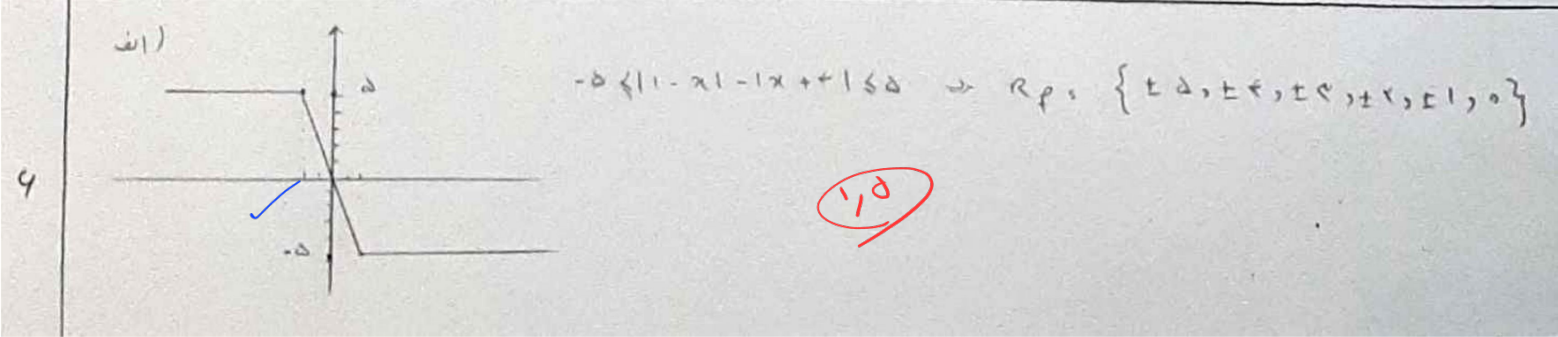
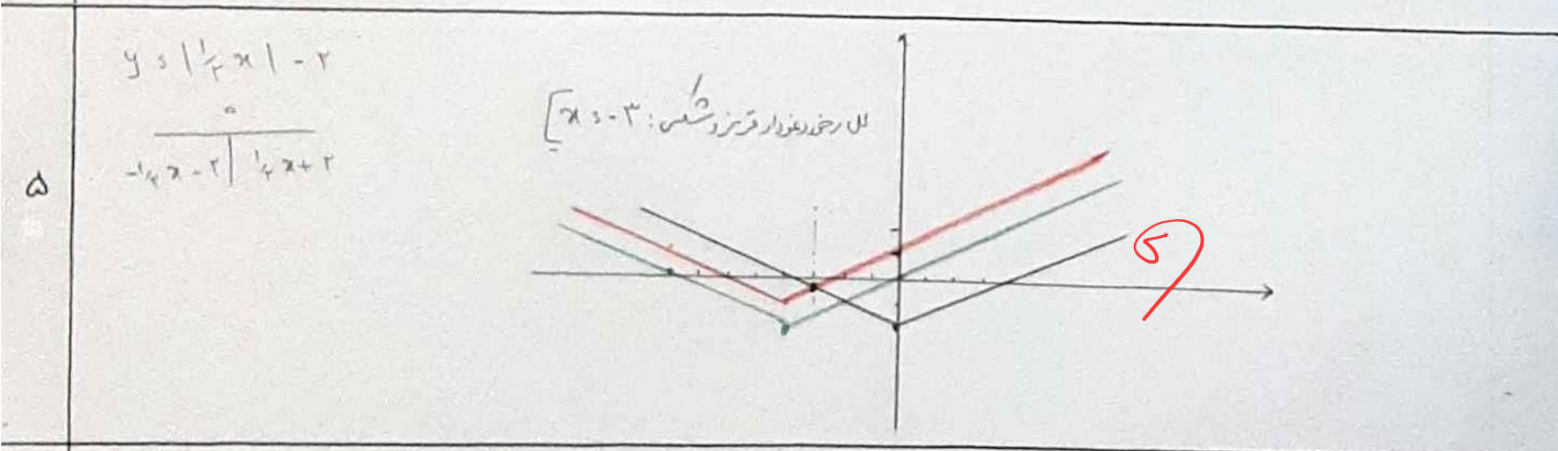
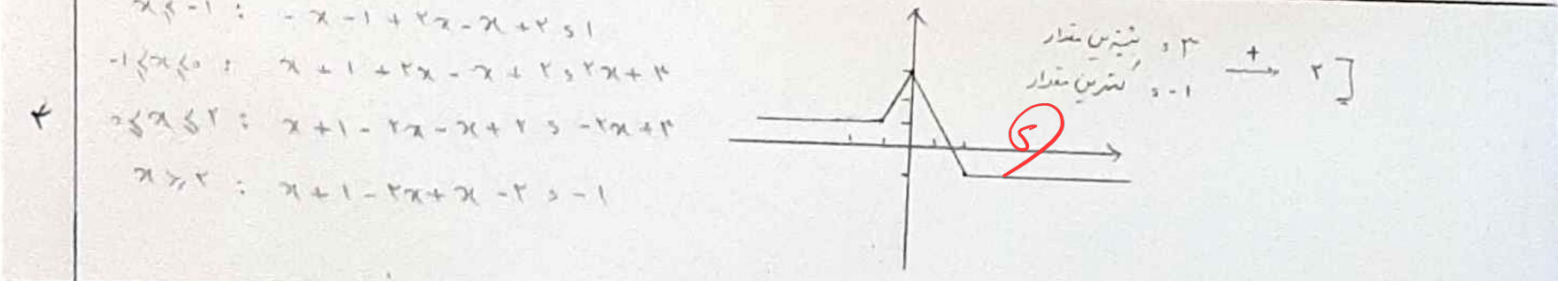


1 $\frac{1}{x-1} \geq x-1 \rightarrow (x-1)^2 \geq 1 \rightarrow x^2 - 2x + 1 \geq 1 \rightarrow x(x-2) \geq 0 \rightarrow x \leq 0 \text{ یا } x \geq 2$
 بررسی می‌کنیم $x^2 - 1 \geq 1 \rightarrow x^2 \geq 2 \rightarrow x \leq -\sqrt{2} \text{ یا } x \geq \sqrt{2}$
 در صورت اول: $x \leq 0$ و $x \leq -\sqrt{2}$ پس $x \leq -\sqrt{2}$
 در صورت دوم: $x \geq 2$ و $x \geq \sqrt{2}$ پس $x \geq 2$

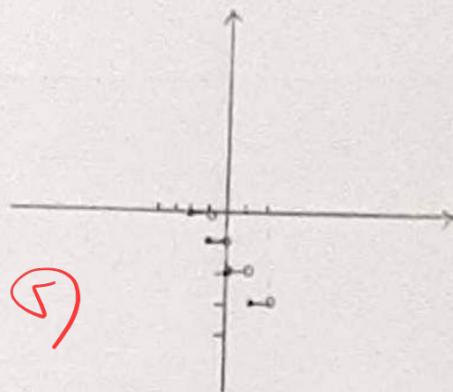
2 الف) $-2 \leq \frac{x-1}{x} < 2 \rightarrow \frac{x-1}{x} - 2 < 0 \rightarrow \frac{x-1-2x}{x} < 0 \rightarrow \frac{-x-1}{x} < 0 \rightarrow x > -1$
 $\frac{x-1}{x} + 2 > 0 \rightarrow \frac{x-1+2x}{x} > 0 \rightarrow \frac{3x-1}{x} > 0 \rightarrow x < \frac{1}{3}$
 پس $x \in (-1, \frac{1}{3})$
 ب) $\frac{x-2}{x+1} < -1 \rightarrow \frac{x-2+x+1}{x+1} < 0 \rightarrow \frac{2x-1}{x+1} < 0 \rightarrow \frac{-1}{x+1} < 0 \rightarrow x > -1$
 $\frac{x-2}{x+1} > 1 \rightarrow \frac{x-2-x-1}{x+1} > 0 \rightarrow \frac{-x-3}{x+1} > 0 \rightarrow \frac{-x-3}{x+1} > 0 \rightarrow x < -3$
 جواب نهایی: $x \in (-3, -1) \cup (-\frac{1}{3}, \frac{1}{3})$

3 $x+4 > x^2 \rightarrow -x^2 + x + 4 > 0 \rightarrow x^2 - x - 4 < 0 \rightarrow (x-2)(x+2) < 0 \rightarrow x \in (-2, 2)$
 $x+4 < -x^2 \rightarrow x^2 + x + 4 < 0 \rightarrow \Delta < 0$ (بی‌حقیقت)
 $|x-\alpha| < \beta \rightarrow -\beta < x-\alpha < \beta \rightarrow \alpha-\beta < x < \alpha+\beta$
 اگر $\alpha = 2, \beta = 2$ پس $x \in (0, 4)$



4) $\frac{1}{x} = \left[1 + \frac{1}{x}\right] \Rightarrow \frac{1}{x} = \underbrace{\left[\frac{1}{x}\right]}_t - 1 \Rightarrow t < 1 \Rightarrow 1 < t+1 < 2 \Rightarrow R_f \in (1, 2)$
 $[-1, 0)$

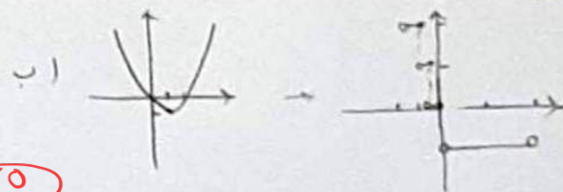
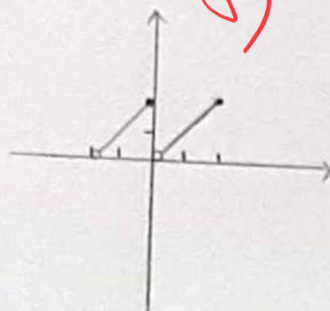
ا) $-1 < x \leq -1/2$ $\Rightarrow 1 \leq -2x \leq 2 \xrightarrow{[-x] \geq 1} y \geq 1$
 $-1/2 < x \leq 0$ $\Rightarrow 0 \leq -2x < 1 \xrightarrow{[-x] \geq 0} y \geq 1$
 $0 < x \leq 1/2$ $\Rightarrow -1 \leq -2x < 0 \xrightarrow{[-x] \geq -1} y \geq -1$
 $1/2 < x \leq 1$ $\Rightarrow -2 \leq -2x < -1 \xrightarrow{[-x] \geq -2} y \geq -2$



c) $x \in (-1, 1)$ $\Rightarrow -1 < \frac{x}{r} < 1$

$-1 < \frac{x}{r} \leq 0 \xrightarrow{[\frac{x}{r}] = -1} y \leq x + 1 \quad (-1 \leq x \leq 0)$

$0 < \frac{x}{r} < 1 \xrightarrow{[\frac{x}{r}] = 0} y \leq x \quad (0 < x < 1)$



1, VO

$$a + [b]_s, \epsilon, r \xrightarrow{b \in \mathbb{Z}'} a, \epsilon, r$$

ثاني : $[a], r, t-b \xrightarrow{[a] \in \mathbb{Z}'} r, t-b \in \mathbb{Z}' \Rightarrow b, a, t$

$$\rightarrow \begin{cases} [a] + [b] \leq r \\ [b] - [a] \leq r \end{cases} \rightarrow \begin{matrix} [b] \leq r \\ [a] \leq l \end{matrix} \rightarrow \begin{matrix} b \leq r, r \\ a \leq l, l \end{matrix} \xrightarrow{+} r, r$$

باب جوان رسین، اید عذراف دی نیی → ۱ < (۱۶ - ۱)

$(1 + \sqrt{2})^4 + 198 - (1 - \sqrt{2})^4 \Rightarrow [(1 + \sqrt{2})^4 + 198]$
 این عدد صورت ۱۹۷ است
 (۱۹۷، ۹۹۵)