

$x \neq 1$

$1 = (x-1)^2 \Rightarrow x^2 - 2x + 1 - 1 = 0 \Rightarrow x(x-2) = 0 \Rightarrow x = \begin{cases} 0 \rightarrow -1 = 1 \times \\ 2 \rightarrow 1 = 1 \checkmark \end{cases}$ (۲) ۱

الف) $x \neq 0$

$-2 < \frac{2x-1}{x} < 2 \Rightarrow \begin{cases} \frac{2x-1}{x} < 2 \Rightarrow 2x-1 < 2x \Rightarrow -1 < 0 \\ \frac{2x-1}{x} > -2 \Rightarrow 2x-1 > -2x \Rightarrow 4x > 1 \Rightarrow x > \frac{1}{4} \end{cases}$ (۲) ۱

$\Rightarrow x > \frac{1}{4} \rightarrow (\frac{1}{4}, +\infty)$

$\Rightarrow \frac{x-2}{2x+1} > 1 \Rightarrow \frac{x-2-2x-1}{2x+1} > 0 \Rightarrow \frac{-x-3}{2x+1} > 0 \Rightarrow \frac{-x-3}{2x+1} > 0 \Rightarrow -x-3 > 0 \Rightarrow x < -3$

$\frac{x-2}{2x+1} < -1 \Rightarrow \frac{x-2+2x+1}{2x+1} < 0 \Rightarrow \frac{3x-1}{2x+1} < 0 \Rightarrow \frac{3x-1}{2x+1} < 0 \Rightarrow 3x-1 < 0 \Rightarrow x < \frac{1}{3}$

$\Rightarrow x \in (-3, -\frac{1}{3}) \cup (-\frac{1}{3}, \frac{1}{3})$ ✓

$-x-4 < x^2 < x+4$

$x^2 < x+4 \Rightarrow x^2 - x - 4 < 0 \Rightarrow \frac{-23}{11-1+} \Rightarrow -5 < x < 4$ (۲) ۱

$x^2 > -x-4 \Rightarrow x^2 + x + 4 > 0$

$\Rightarrow -2 < x < 2 \rightarrow \frac{2+(-2)}{2} = \frac{1}{2} \rightarrow \text{مركز} \Rightarrow |x-\alpha| < \beta$

$\rightarrow |x-\frac{1}{2}| < \frac{5}{2}$

$\Rightarrow \alpha = \frac{1}{2}$ ✓

$\{ \text{شماره} \} = -1, 0, 2$

if $x \geq 2 \Rightarrow y = x+1 - 2x + x-2 = -1$ Min

if $0 \leq x < 2 \Rightarrow y = x+1 - 2x - x+2 = -2x+3 \xrightarrow{x=0} y=3$ Max

if $-1 \leq x < 0 \Rightarrow y = x+1 + 2x + 2 - x = 2x+3$

if $x < -1 \Rightarrow y = -x-1 + 2x - x+2 = 1$

$\Rightarrow \text{Min} + \text{Max} = -1 + 3 = 2$ ✓

$y = \left| \frac{1}{x} \right| - 2$ یک واحد به طرف بالا یک واحد به طرف پایین $\frac{1}{x} \left| x+4 \right| - 1$

$\frac{1}{x} \left| x+4 \right| - 1 = \left| \frac{1}{x} \right| - 2 \Rightarrow x = -3$ ✓

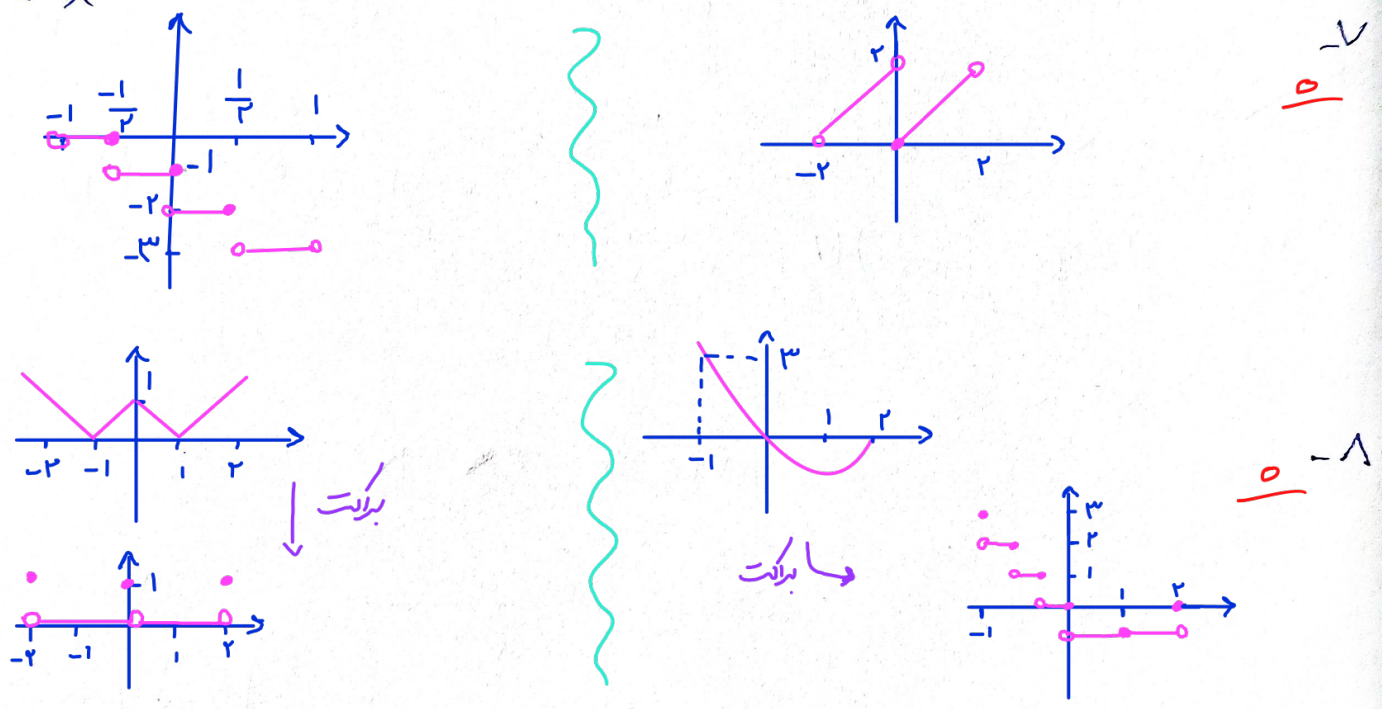
الف) -4 (ریشه) -9 (1, 7.5)

if $x \geq 1 \Rightarrow f(x) = 0$
 if $-4 \leq x < 1 \Rightarrow f(x) = -2x - 2$
 if $x < -4 \Rightarrow f(x) = 0$

$x = -4 \Rightarrow f = 0 \Rightarrow -5 < f < 0$
 $x = 1 \Rightarrow f = -5$

$R_f = [-5, 0]$ ✓ چون بدلت داریم، برد فقط شامل اعداد صحیح این بازه می باشد

ب) $f(x) = \frac{1}{x} - \left[\frac{1}{x} + 1 \right] = \frac{1}{x} - \left[\frac{1}{x} \right]$
 $0 \leq \frac{1}{x} < 1 \Rightarrow -1 \leq f(x) < 0 \Rightarrow R_f = [-1, 0)$ ✓



$a + [b] = 4, 2 \Rightarrow [a] + [b] = 4$
 $b - [a] = 2, 4 \Rightarrow [b] - [a] = 2$

$2[b] = 4 \Rightarrow [b] = 2$
 $\Rightarrow [a] = 1$

$\Rightarrow b - 1 = 2, 4 \Rightarrow b = 3, 4 \Rightarrow a + b = 1, 2 + 3, 4 = [4, 6]$ ✓
 $a + 3 = 4, 2 \Rightarrow a = 1, 2$

$1 - \sqrt{2} = -(\sqrt{2} - 1)$ -10 (2)

$|1 - \sqrt{2}| < 1 \Rightarrow (1 - \sqrt{2})^4 \approx 0.005$
 $(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 198$
 $\Rightarrow (1 + \sqrt{2})^4 \approx 198 - 0.005 = 197.995$
 $\Rightarrow [197.995] = [197]$ ✓