

یک ریشه دارد

1

$$\frac{1}{x-1} = |x-1| \Rightarrow \begin{cases} x > 1 \rightarrow x-1 = \frac{1}{x-1} \rightarrow (x-1)^2 = 1 \Rightarrow \boxed{x=2 \text{ و } x=0} \\ x < 1 \rightarrow \frac{1}{1-x} = x-1 \rightarrow x^2 - 2x + 1 = 0 \rightarrow \Delta < 0 \text{ ریشه ندارد} \end{cases}$$

2

الف)  $|2 - \frac{1}{x}| < 2 \Rightarrow -2 < 2 - \frac{1}{x} < 2 \Rightarrow -4 < -\frac{1}{x} < 0 \Rightarrow \begin{cases} x > 0 \\ x > \frac{1}{4} \end{cases} \Rightarrow \text{جواب} = (\frac{1}{4}, +\infty)$

ب)  $\begin{cases} \frac{x-2}{2x+1} > 1 \rightarrow \frac{-x-3}{2x+1} > 0 \rightarrow \frac{-3}{2} < -\frac{1}{2} \rightarrow (-\frac{3}{2}, -\frac{1}{2}) \\ \frac{x-2}{2x+1} < -1 \rightarrow \frac{3x-1}{2x+1} < 0 \rightarrow \frac{-1}{2} < \frac{1}{3} \rightarrow (-\frac{1}{2}, \frac{1}{3}) \end{cases} \Rightarrow \text{جواب} = (-\frac{3}{2}, \frac{1}{3}) \cup (-\frac{1}{2}, \frac{1}{3})$

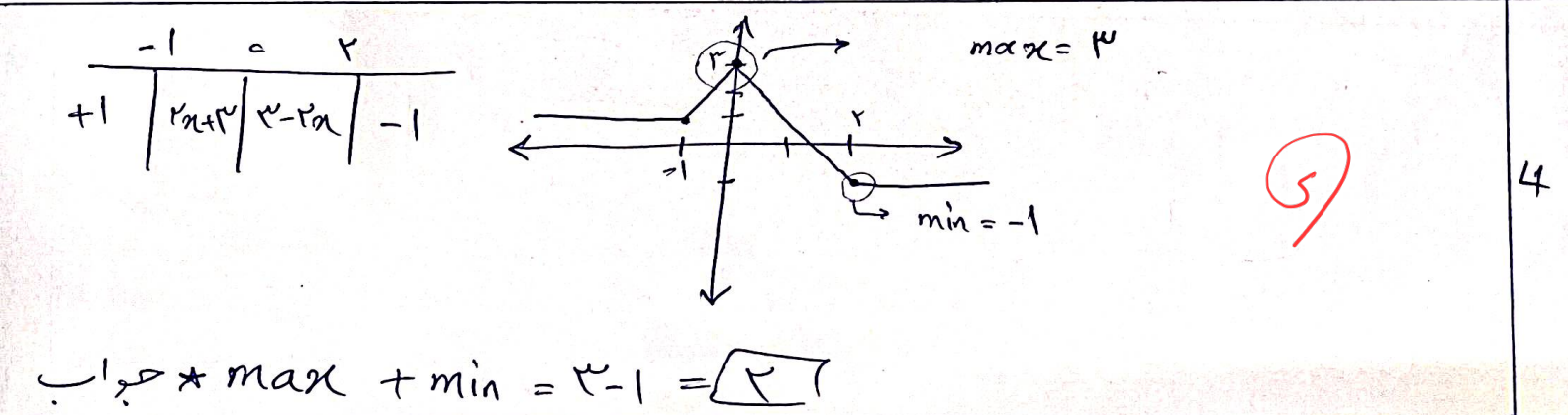
3

$x+9 > x^2 \Rightarrow (x-3)(x+2) < 0 \Rightarrow \frac{-2}{+} \frac{3}{-} \Rightarrow \text{جواب} = (-2, 3) \quad (*)$

$x+9 < -x^2 \Rightarrow x^2 + x + 9 < 0 \Rightarrow \Delta < 0 \text{ ریشه ندارد}$

$(*) \rightarrow \text{میانگین} = \frac{3-2}{2} = \frac{1}{2} \rightarrow \boxed{|x - \frac{1}{2}| < \frac{5}{2}} \rightarrow -2 < x < 3$

$\downarrow$   
 $\text{محدود} \quad 3 - \frac{1}{2} = \frac{5}{2}$   
 $|x - \alpha| < \beta \rightarrow \begin{cases} \alpha = \frac{1}{2} \\ \beta = \frac{5}{2} \end{cases} = \text{جواب}$



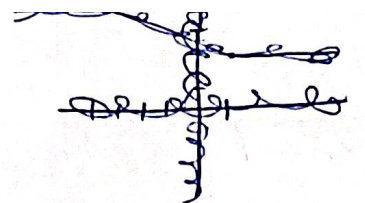
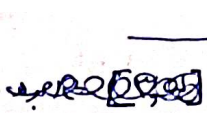
5

مقدار جدید =  $|\frac{1}{2}(x+2)| - 2 + 1 = |\frac{1}{2}x + 1| - 1$

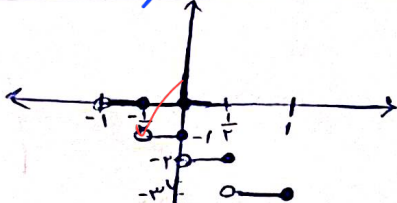
نقطه تقاطع  $\rightarrow |\frac{1}{2}x + 1| - 1 = |\frac{1}{2}x| - 2 \rightarrow |\frac{1}{2}x + 1| - |\frac{1}{2}x| = -1$

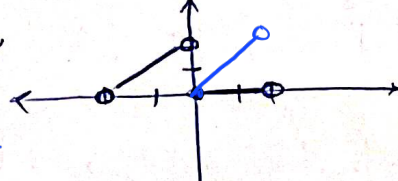
$\begin{matrix} -2 & 0 \\ \hline -1=0 & x=-2 & 2=0 \\ \hline \text{X} & \checkmark & \text{X} \end{matrix}$

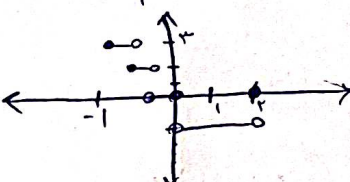
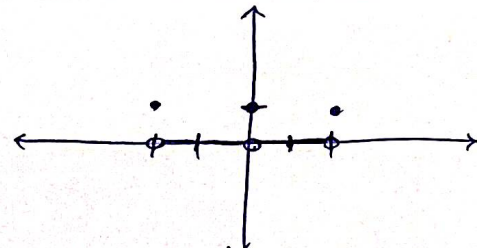
$\boxed{x = -2} \text{ جواب}$

الف)  $\frac{-\varepsilon}{1} + a$     $R_f = [-a, a]$  بدون برکت  $\downarrow$   $\star$  جواب  $\rightarrow \{-a, -\varepsilon, \varepsilon, -1, 1, a\}$   $R_f = \{0, 1, 5, \varepsilon, a\}$  ۱, ۵

ب)  $\frac{1}{x} - [1 + \frac{1}{x}] = -1 + \frac{1}{x} - [\frac{1}{x}] \rightarrow R = [1, 2]$   
 $0 \leq \frac{1}{x} < 1$   
 $R = [-1, 0]$

الف)  $\begin{cases} -2 < -2x < -1 \\ -1 < -2x < 0 \\ 0 \leq -2x < 1 \end{cases} \rightarrow \begin{cases} -1 < x \leq -\frac{1}{2} \rightarrow 0 \\ -\frac{1}{2} < x \leq 0 \rightarrow -1 \\ 0 < x \leq \frac{1}{2} \rightarrow -2 \\ \frac{1}{2} < x \leq 1 \rightarrow -3 \end{cases}$   ۱, ۵

ب)  $\begin{cases} -2 < x < 0 \rightarrow x+2 \\ 0 \leq x < 2 \rightarrow x \end{cases}$  

الف)  $\begin{cases} x = -2 \rightarrow 1 \\ -2x \leq -1 \rightarrow 0 \\ -1 < x \leq 0 \rightarrow 0 \\ 0 < x \leq 1 \rightarrow 0 \\ 1 < x \leq 2 \rightarrow 0 \\ x = 2 \rightarrow 1 \end{cases}$    ۵

ب)  $[b] = 3 \rightarrow 3 \leq b < 4$   
 $\begin{cases} [a] + [b] = \varepsilon \\ [b] - [a] = 2 \end{cases} \rightarrow \begin{cases} \alpha + [b] = \varepsilon, 2 \\ b - [a] = 2, \varepsilon \end{cases}$   
 $\begin{cases} \alpha + 3 = \varepsilon, 2 \\ b - 1 = 2, \varepsilon \end{cases} \rightarrow \begin{cases} \alpha = \varepsilon, 1 \\ b = 3, \varepsilon \end{cases}$   
 $[a] = 1 \rightarrow 1 \leq \alpha < 2 \rightarrow \alpha = 1, 2$   
 $\alpha + b = \varepsilon, 4$  ۵

$(1 + \sqrt{2})^9 + (1 - \sqrt{2})^9 = 198 \rightarrow 198 - (1 - \sqrt{2})^9 = 197, \dots$   
 عدد گسسته منفی (مثلاً  $-\frac{4}{7}$ )  
 $(1 + \sqrt{2})^9 = [197, \dots] = 197$  جواب ۵  
 به توان زوج که بر سه گسسته  $\oplus$  می باشد  
 وقتی از ۱۹۸ کم می شود  
 ۱۹۷، ... می شود