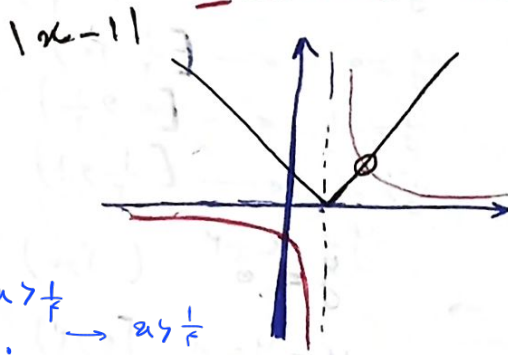


① $\frac{1}{x-1} = |x-1|$



۱۸
۱ ریشه دارد. ۵

$-2 < \frac{x-1}{x} < 2 \Rightarrow \begin{cases} \frac{x-1}{x} > -2 \rightarrow x > \frac{1}{3} \\ \frac{x-1}{x} < 2 \rightarrow x > \frac{1}{5} \end{cases}$

الف) ۲) $-2 < \frac{x-1}{x} < 2 \rightarrow -2 < 2 - \frac{1}{x} < 2 \rightarrow 0 < \frac{1}{x} < 4 \rightarrow 0 < x < \frac{1}{4}$

ب) $\frac{x-2}{2x+1} > 1 \quad \vee \quad \frac{x-2}{2x+1} < -1 \rightarrow \frac{-x-3}{2x+1} > 0 \rightarrow \frac{-x-3}{2x+1} > 0$

$\frac{-x-3}{2x+1} > 0 \rightarrow x \in (-3, -\frac{1}{2})$ ②

① $\rightarrow x \in (-\frac{1}{2}, \frac{1}{4}) \rightarrow \text{I} \cup \text{II} = (-\frac{1}{2}, \frac{1}{4}) \cup (-3, -\frac{1}{2})$

۳) اگر $x < -4 \rightarrow x^2 + x + 4 < 0 \rightarrow$ غلط و اگر $x > -4 \rightarrow x^2 - x - 4 < 0$

$\frac{-2+3}{4} = \frac{1}{4} \leftarrow -2 < x < 3 \leftarrow x \in (-2, 3) \leftarrow (x-3)(x+2) < 0$
 $\rightarrow -\frac{5}{2} < x - \frac{1}{2} < \frac{5}{2} \rightarrow |x - \frac{1}{2}| < \frac{5}{2} \rightarrow x = \frac{1}{2}$

۴) $\frac{-1}{1} \quad 0 \quad 2$
 ① $\frac{1}{x+3} \quad \frac{1}{-x+3} \quad \frac{1}{-1} \quad \frac{1}{1}$
 $[1, 3] \quad 3 \quad [-1, 3] \quad -1$
 $\rightarrow R_y = [-1, 3] \rightarrow y_{\max} = 3$
 $y_{\min} = -1$

۵) $|\frac{1}{x}(x+2)| - 1 = |\frac{1}{x}x - 2| \rightarrow |\frac{1}{x}x + 2| - |\frac{1}{x}x| = -1$
 $x + 2 = -1 \rightarrow x = -3$

الف) $\frac{-5}{-2x-3} \quad \frac{x \geq 1}{-5 < x < 1} \rightarrow (-5, 1)$
 $\frac{x \leq -4}{x} \rightarrow R_f = [-5, 5]$
 $R_f = [-5, 5] \leftarrow [1 - |x| - |x+2|]$

ب) ۹) $\frac{1}{x} \in [1 + \frac{1}{x}] \rightarrow \frac{1}{x} - [\frac{1}{x}] - 1 \rightarrow -1 < y - 1 < 0$
 $y = \frac{t - [t]}{1}$
 (برای هر عدد صحیح و کسری از ۱)
 $R_f = [-1, 0]$

⑤ $y = [-2x] - 1 \rightarrow$

الف

$y = 1 \leftarrow (-1, -\frac{1}{2})$

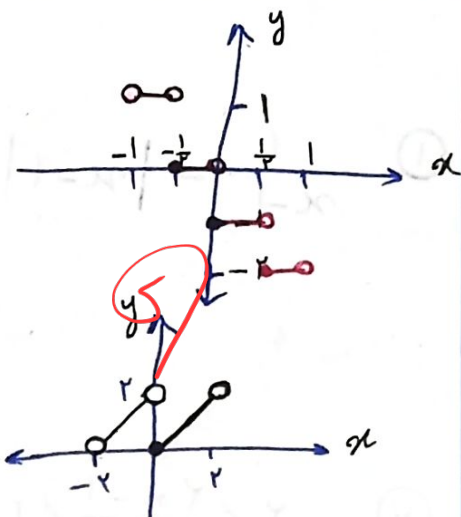
$y = 0 \leftarrow (-\frac{1}{2}, 0)$

$y = -1 \leftarrow (0, \frac{1}{2}) \rightarrow$

$y = -2 \leftarrow (\frac{1}{2}, 1)$

$y = x + 2 \quad (-2, 0)$

$y = x \quad (0, 2)$

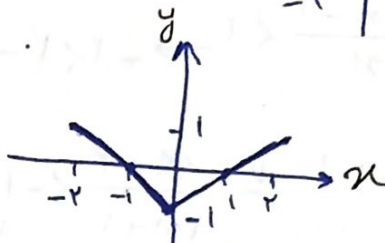
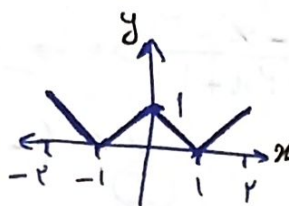


ب) $y = x - 2 \left[\frac{x}{2} \right] \rightarrow$

⑧ $y = [|x| - 1] \rightarrow y = |x| - 1$

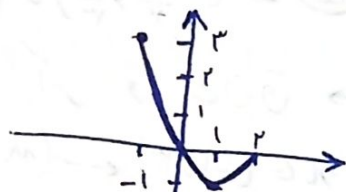
$y = |x| - 1 \rightarrow$

الف

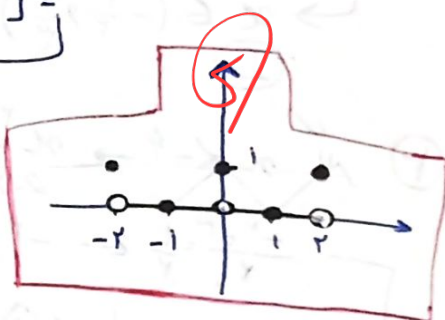
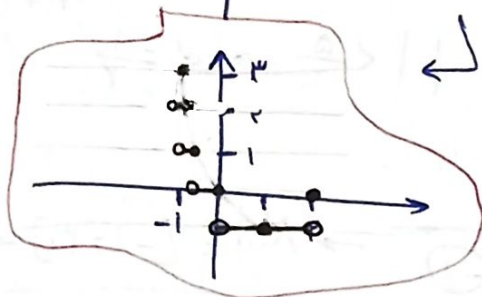


$[|x| - 1] =$

ب) $y = x^2 - 2x \rightarrow$



$y = [x^2 - 2x]$



⑨ $[a] + [b] = [4, 2]$

$[b] - [a] = [2, 4]$

$2[b] = 4 \rightarrow [b] = 2, \rightarrow b = 2, 4, [a] + 2 = 4 \rightarrow [a] = 2 \rightarrow a = 2, 4$

$a + b = 4, 6$

⑩ $[(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4] = [198] \rightarrow [(1 + \sqrt{2})^4] + [(1 - \sqrt{2})^4] = 198$

چون جمع قیمت اعشاری شان
بزرگ نباشد

$0 < (1 - \sqrt{2})^4 < 1$

$[(1 + \sqrt{2})^4] = 198$
 $[(1 + \sqrt{2})^4] = [198 - (1 - \sqrt{2})^4]$

$= [(1 + \sqrt{2})^4] = 198 + [- (1 - \sqrt{2})^4] = 198 - 1 = 197$