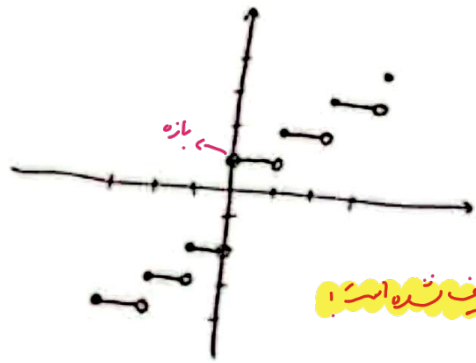
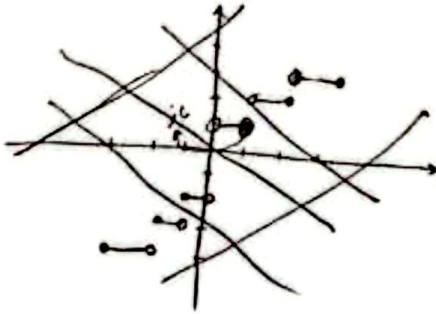


① $y = r \sin^2(x + \frac{\pi}{4}) - 1 \rightarrow \sin^2(x + \frac{\pi}{4}) \leq 1 \rightarrow 0 \leq r \sin^2(x + \frac{\pi}{4}) \leq r$
 $R_y = [-1, 1] \checkmark \rightarrow -1 \leq r \sin^2(x + \frac{\pi}{4}) - 1 \leq 1$ (۲)

$\Rightarrow y(x) = r \cos^2 x - 1 \rightarrow -1 \leq \cos^2 x \leq 1 \rightarrow -r \leq r \cos^2 x \leq r \rightarrow -r - 1 \leq r \cos^2 x - 1 \leq r - 1 \rightarrow R_{y(x)} = [-r-1, r-1] \checkmark$

② $[-2, -2] \rightarrow -4$
 $[-2, -1] \rightarrow -3$
 $[-1, 0] \rightarrow -2$
 $(0, 1) \rightarrow -1$
 $[1, 2] \rightarrow 0$
 $[2, 3] \rightarrow 1$
 $3 \rightarrow 2$

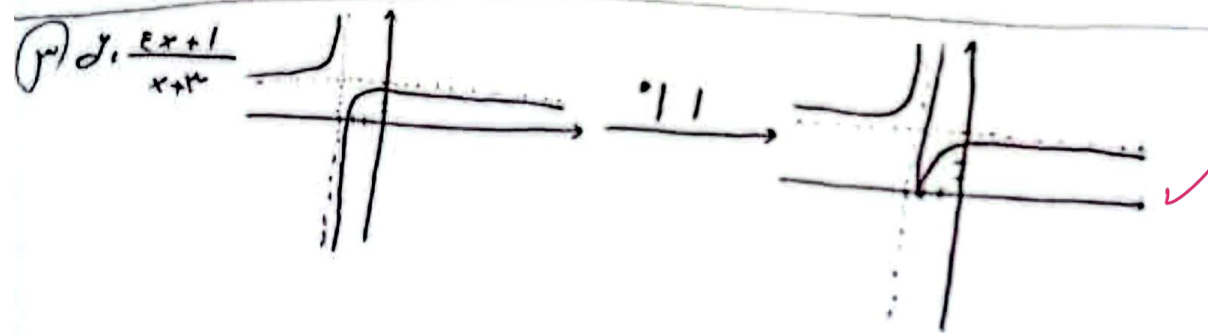


14, 25

مقطع اول

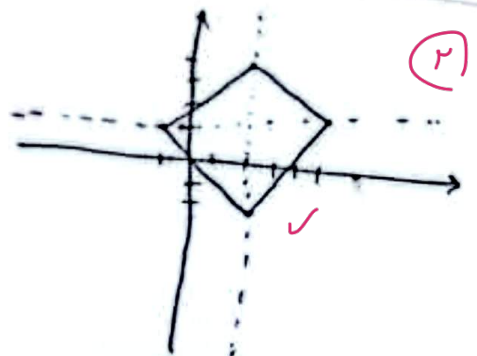
(۱, ۱, ۱)

صفر تعریف شده است



(۲)

④ $\begin{cases} x > 2 \\ y < 1 \end{cases} \rightarrow y = -x + 4 \checkmark$
 $\begin{cases} x < 2 \\ y > 1 \end{cases} \rightarrow y = x + 2 \checkmark$
 $\begin{cases} x < 2 \\ y < 1 \end{cases} \rightarrow y = x \checkmark$
 $\begin{cases} x > 2 \\ y > 1 \end{cases} \rightarrow y = x - 4 \checkmark$



(۲)

⑤ $y = (1 + \sin x)(1 + \sin x) = 1 + 2\sin x + \sin^2 x \rightarrow \sin^2 x \in [0, 1] \rightarrow R_y = [1, 2] \checkmark$

(۱)

الف) $f(x) = x + \frac{1}{x} + 2\sqrt{x + \frac{1}{x}}$

$\begin{cases} \min \square \cdot f \rightarrow f(x) = 2 + 2\sqrt{2} \end{cases}$

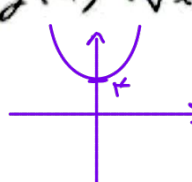
$\begin{cases} \max \square \sim \infty \rightarrow f(x) = +\infty \end{cases}$

$\square = -\frac{b}{2a} = -1 \times$

$\Rightarrow R_f = [2 + 2\sqrt{2}, +\infty)$

$$y \rightarrow \frac{r_9}{r} + \frac{r_{11}}{r} + \frac{r_4}{r} + \frac{r_5}{r} + \frac{r_{10}}{r} + \frac{r_{12}}{r} + V + A + 9 = V \omega \quad \checkmark$$

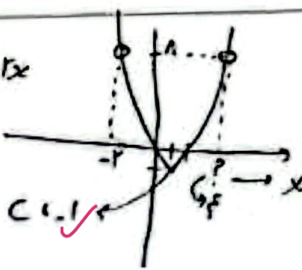
$$a > 0 \rightarrow \sqrt{bx+c} \rightarrow \frac{rb+c}{rb+c+1} \rightarrow \frac{6}{6+1} \rightarrow c=1 \rightarrow g(x) = \sqrt{x^2+1} \rightarrow x_3 = -1, y_3 = 1$$

صحنه آخر...

$$f(x) = \frac{x(x+2)(x-2)}{(x+2)} = x^2 - 2x$$

$$f\left(\frac{a+\epsilon}{r}\right) \rightarrow f(-1) \quad \checkmark$$



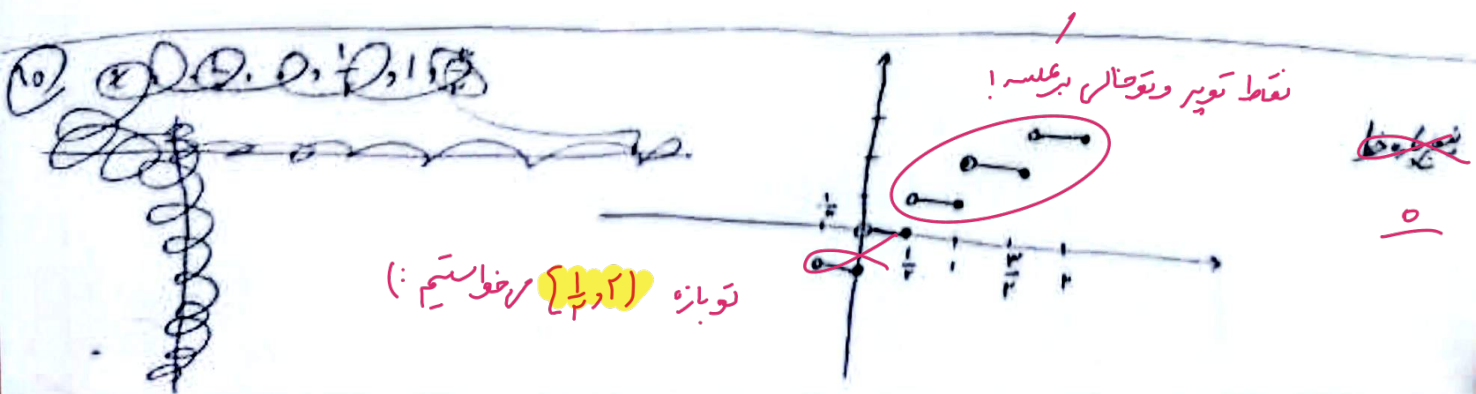
$$x^2 - 2x = 1 \rightarrow x^2 - 2x - 1 = 0 \rightarrow (x+2)(x-4) = 0$$

$$\begin{matrix} a = -2 \\ b = 4 \end{matrix}$$

$$g: \sqrt{x^3+ax^2+bx-1} = \sqrt{(x-2)^3} \rightarrow (x-2)^3 = x^3 - 6x^2 + 12x - 8$$

$$\begin{cases} a = -6 \\ b = 12 \end{cases} \rightarrow [a, b] = [-6, 12]$$

$$R_g = [-1, 1] \quad \checkmark$$

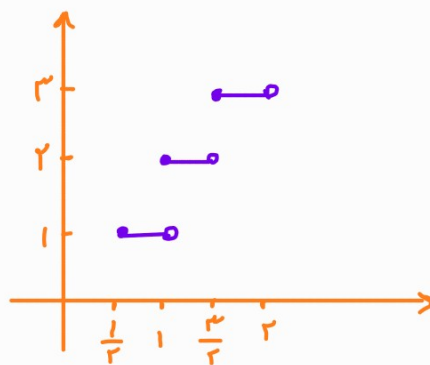


۷- با توجه به دامنه، زیر ادیکال یک خط با شیب مثبت بوده یعنی $a=0$ است و نقطه $(2,0)$ هم در معادله خط صدق میکند...

$$\begin{cases} (2,0) \rightarrow 2b+c=0 \\ (3,1) \rightarrow 3b+c=1 \end{cases} \rightarrow b=1, c=-2$$

$$g(x) = \sqrt{x^2+4} \rightarrow \text{ext} \Big|_4^0 \Rightarrow R_g = \sqrt{[4, +\infty)} = [2, +\infty)$$

$$y = \begin{cases} \frac{1}{2} \leq x < 1 \rightarrow y = 0+1 = 1 \\ 1 \leq x < \frac{3}{2} \rightarrow y = 1+1 = 2 \\ \frac{3}{2} \leq x < 2 \rightarrow y = 1+2 = 3 \end{cases}$$



۱۰-
سه پاره خط