

① الف) $\sin x \begin{cases} \rightarrow \max \rightarrow 1 \rightarrow ① \\ \rightarrow \min \rightarrow 0 \rightarrow ② \end{cases}$

$R_f = [-1, 1]$ ✓

②

ب) $\begin{cases} 3x(1) - 4 = -1 \\ 3x(-1) - 4 = -7 \end{cases} \rightarrow R_g = [-7, -1]$ ✓

② $[-3, -2) \quad -1 - 3 = (-4)$

$[-2, -1) \quad -1 - 2 = (-3)$

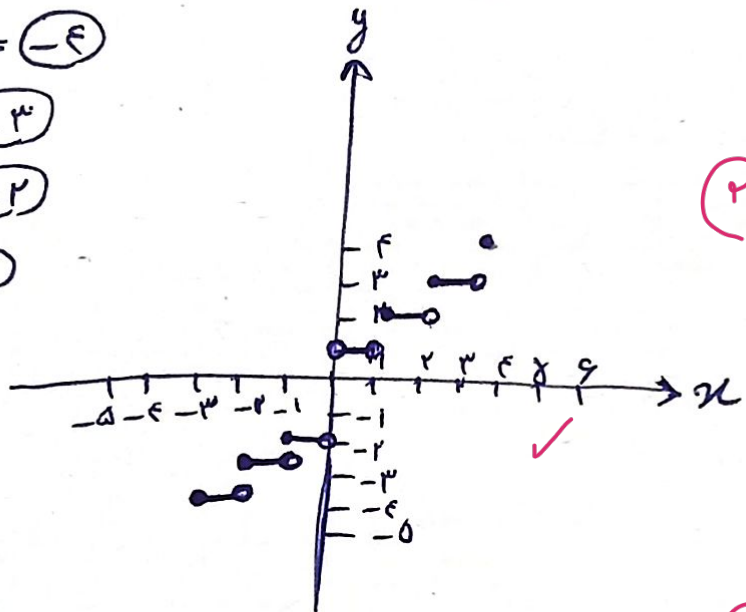
$[-1, 0) \quad -1 - 1 = (-2)$

$[0, 1) \quad 1 + 0 = ①$

$[1, 2) \quad 1 + 1 = ②$

$[2, 3) \quad 1 + 2 = ③$

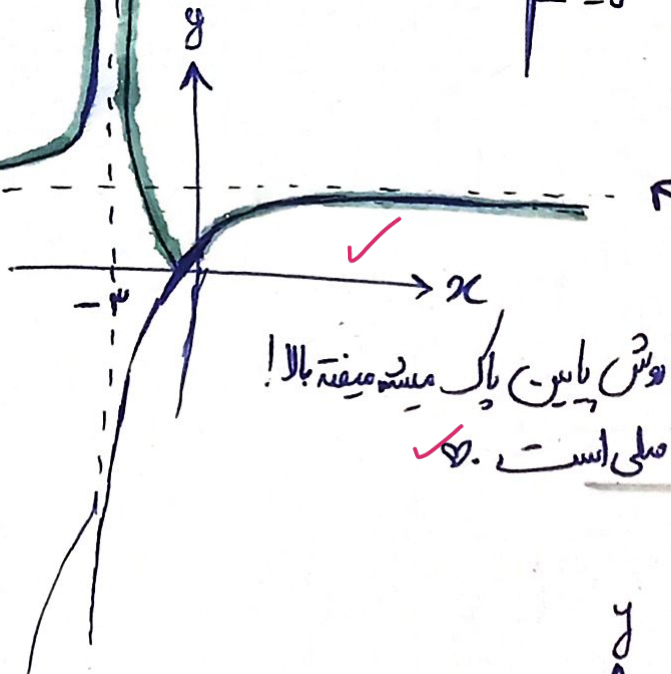
$3 \rightarrow ④$



②

③

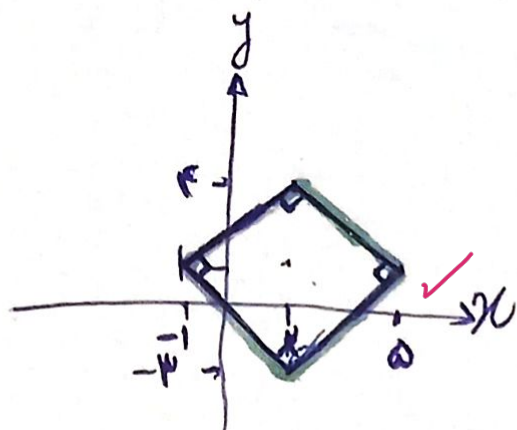
$\frac{4x+1}{x+3} \rightarrow$



وقتی قدر مطلق میاد روش پارسین پاک میشه صیفه بالا!
رنگ سبز شکل اصلی است. ✓

②

④ $|x-2| + |y-1| = 3 \rightarrow$



①

با منطقه بندی !!

صیفه آفر...

④ الف) $x + \frac{1}{x} + 2\sqrt{x + \frac{1}{x}} \rightarrow \sqrt{x + \frac{1}{x}} = t$ (2)

$t^2 + 2t \rightarrow \text{Max} \rightarrow +\infty$
 $\rightarrow -\frac{b}{2a} \rightarrow -\frac{1}{2} \rightarrow -100\text{€}$
 $\rightarrow \text{min} \rightarrow \sqrt{2} \rightarrow 2 + 2\sqrt{2}$

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

ب) $-\sin^2 x + 2\sin x + 3 \rightarrow \text{Max} \rightarrow \textcircled{E}$

$\rightarrow -\frac{b}{2a} \rightarrow -\frac{2}{-2} \rightarrow \textcircled{E}$
 $\rightarrow \text{min} \rightarrow \textcircled{O}$

$R_y = [0, E]$

⑤ $\{1, 2, 3, 4, 5, 6, 7, 8, 9\} - \frac{1}{x}x + 10 \rightarrow \left\{\frac{29}{3}, \frac{28}{3}, \dots, \frac{21}{3}\right\}$ (2)

$\frac{1}{x} \left(\frac{d}{dx} \left(\frac{x^2}{2} \right) \right) = \boxed{\sqrt{2}}$

⑥ $a \neq 0 \rightarrow \begin{cases} 2b + c = 0 \\ 3b + c = 1 \end{cases} \rightarrow \boxed{b=1} \quad c=-2$ (1, 2)

$g(x) = \sqrt{x^2 + 4} \rightarrow R_g = [2, +\infty)$ 'اصل بنویس'

⑦ $a = -2 \rightarrow f(x) = \frac{x(x+2)(x-2)}{(x+2)} \rightarrow x^2 - 2x = 1$ (2)

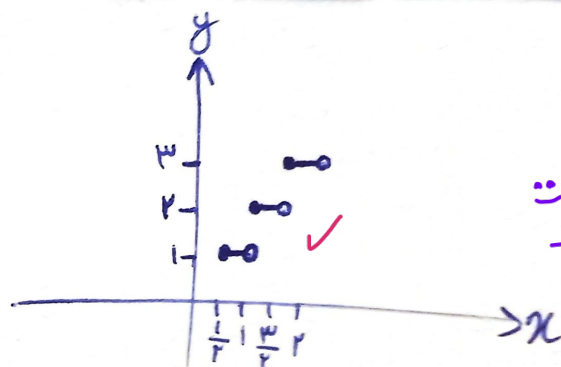
$x^2 - 2x \rightarrow \frac{-b}{2a} \rightarrow c = 1 - 2 = \boxed{-1}$
 $\rightarrow f(-1) = \boxed{3}$

$x^2 - 2x - 1 = 0$
 $(x-4)(x+2) = 0 \rightarrow \boxed{b=4}$

⑧ $(x-2)^3 = x^3 - 6x^2 + 12x - 8 \rightarrow \begin{cases} a = -6 \\ b = 12 \end{cases}$ (2)

$y = x - 2 \rightarrow R_y = [-1, 10]$
 $D_y = [-6, 12]$

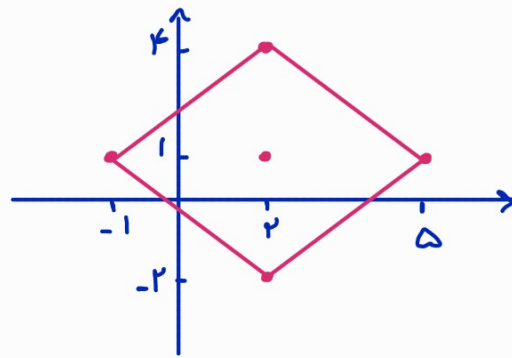
1. $[\frac{1}{4}, 1)$ $0 + 1 = ①$
 $[\frac{1}{2}, \frac{3}{4})$ $1 + 1 = ②$
 $[\frac{3}{4}, 2)$ $1 + 2 = ③$



سہ پارہ نقطہ :

(1, 2.5)

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



۴-

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

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

$$g(x) = \sqrt{x^2 + 4} \rightarrow \text{ext} \Big|_2^{\circ} \Rightarrow R_g = \sqrt{[2, +\infty)} = [2, +\infty)$$