

$$x=1 \rightarrow 2f(1) = 3 + f(1) \rightarrow f(1) = 1, f(x) = ax + b \rightarrow$$

$$2ax + 2a + 2b + ax + 2a = 3x + 3 \rightarrow 3ax + 4a + 2b = 3x + 3 \rightarrow$$

$$a=1, b=0 \rightarrow f(x) = x, y = \sqrt{-x^2 + x} \xrightarrow{\text{بنا بر } x} x_{\max} = \frac{1}{4}$$

$$y_{\max} = \frac{1}{4} \rightarrow R_f: \sqrt{[-\infty, \frac{1}{4}]} = [0, \frac{1}{4}]$$

$$f(x) = \frac{(x^2 - 2x)(x+1)}{x+1} \xrightarrow{x \neq -1} f(x) = x^2 - 2x = y \rightarrow$$

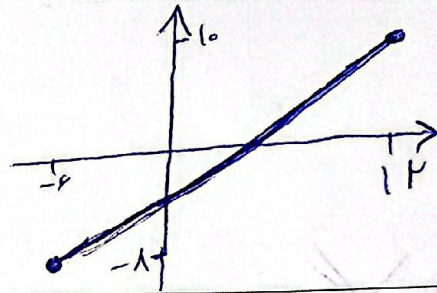
$$x^2 - 2x - y = 0, x_{1,2} = \frac{2 \pm \sqrt{4 - 4(-y)}}{2} \rightarrow y > -1 \rightarrow C = -1$$

$$x^2 - 2x \neq 1 \rightarrow x^2 - 2x - 1 \neq 0 \rightarrow \frac{2 \pm \sqrt{4 + 4}}{2} \xrightarrow{x \neq -1} \begin{cases} x = 1 \rightarrow a = -4 \\ x = -1 \rightarrow b = 4 \end{cases}$$

$$f\left(\frac{a+b}{2}\right) = f\left(\frac{-4+4}{2}\right) = f(0) = 0$$

$$y = \sqrt[3]{(x-1)^3} = \sqrt[3]{x^3 + 12x - 5x^2 - 1} \rightarrow y = x - 1 \rightarrow b = 1, a = -6$$

$$D_y = [-6, 1], R_y = [-1, 1]$$

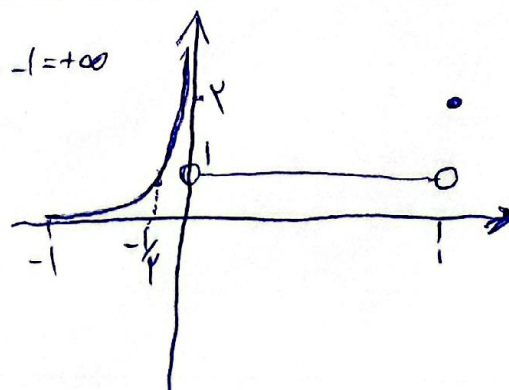


$$\sqrt{\frac{x+1}{1-x}} \rightarrow D_y = \mathbb{R} - \{1\} = R_y \rightarrow \frac{ax^2 + b}{x^2 + c} \xrightarrow{x \rightarrow \infty} y = \frac{a}{c} = -\frac{1}{b}$$

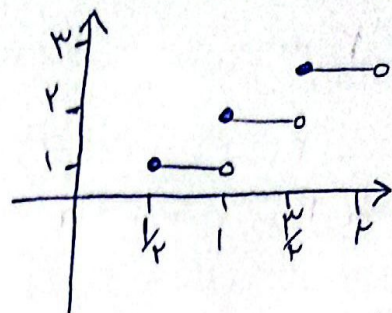
$$R_y = (-\infty, -\frac{1}{b}] \cup (a, +\infty) = \mathbb{R} - [-\frac{1}{b}, a] = \mathbb{R} - \{1\} \rightarrow a = -\frac{1}{b} = 1$$

$$\rightarrow a = 1, b = -1 \rightarrow a + b = 1 - 1 = 0$$

$$\frac{[x]}{x} + \frac{[x]}{x} \begin{cases} x < 0 \\ 0 < x < 1 \\ x = 1 \end{cases} \begin{cases} -1 \\ 0 \\ 1 \end{cases} \xrightarrow{\text{صفری}} \frac{-1}{0} - 1 = +\infty$$



$$y = [x] + [x + \frac{1}{2}] \begin{cases} 1 & \frac{1}{2} \leq x < 1 \\ 2 & 1 \leq x < \frac{3}{2} \\ 3 & \frac{3}{2} \leq x < 2 \end{cases}$$



خط پله

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$$\frac{|x+1|}{|a x + 1|} < 1 \rightarrow |x+1| < |a x + 1| \xrightarrow{\text{فان}} x^2 + 2x + 1 < a^2 x^2 + 2a x + 1$$

$$\rightarrow 0 < (a^2 - 1)x^2 + (2a - 2)x \quad D = (b, +\infty) \xrightarrow{\text{در بازه بازه}} a^2 - 1 = 0$$

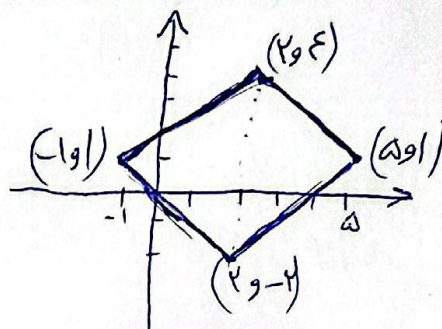
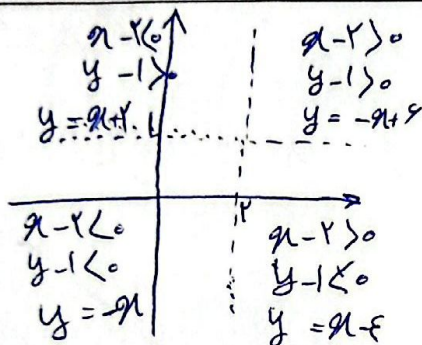
$$\rightarrow a \neq \pm 1 \begin{cases} \rightarrow a = 1 \rightarrow \frac{|x+1|}{|x+1|} < 1 \rightarrow 0 < \varepsilon x + 1 \rightarrow -2 < x \rightarrow b = -2 \\ \rightarrow a = -1 \rightarrow \frac{|x+1|}{|x-1|} < 1 \rightarrow 1 - x - 1 < 0 \rightarrow x < 0 \end{cases}$$

$$a = 1 \text{ نادرست} \rightarrow b = -2 \rightarrow a - b = 1 - (-2) = 3$$

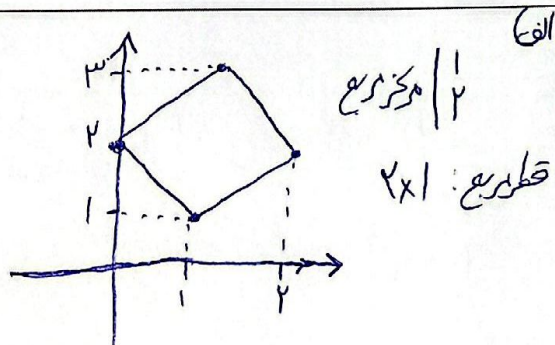
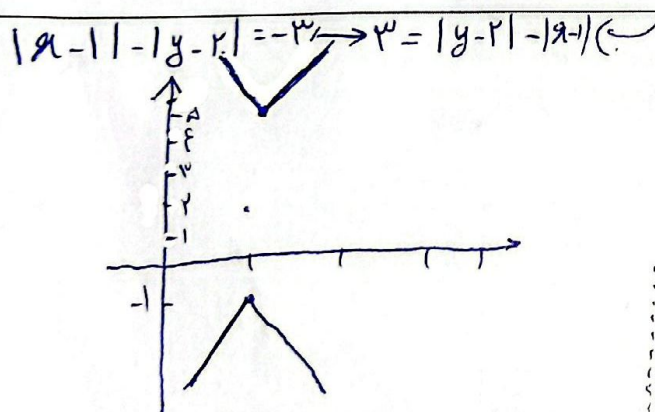
فاصله قبول

فاصله قبول در این حالت
دامنه می توانست +∞ برود

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$$y = 3x + |ax + b| \xrightarrow{ax+b \geq 0} (3+a)x + b = y \Rightarrow b = 0 \rightarrow y = 3x + |ax| \xrightarrow{x \geq 0} (3+a)x$$

$$\xrightarrow{ax+b < 0} (3-a)x - b = y \xrightarrow{x < 0} (3-a)x$$

$$R_y = \mathbb{R} \rightarrow \text{مجموعه مقادیر} \rightarrow 3+|a| > 0 \rightarrow 3-|a| > 0 \rightarrow -3 < a < 3$$

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