

$$f(2x+1) = a(2x+1) + b = 2ax + a + b$$

$$f(x+2) = a(x+2) + b = ax + 2a + b$$

$$f(3) = 3a + b$$

$$3ax + 3a + 2b = 3x + 3a + b \rightarrow a = 1 \rightarrow 3a + 2b = 3a + b \rightarrow b = 0$$

$$f(x) = x$$

$$\sqrt{x - x^2} = y \quad -\frac{b}{2a} = \frac{1}{2} \quad R = \sqrt{(-\infty, \frac{1}{2}]} = [\frac{1}{2}, \infty) \checkmark$$

$$f(x) = \frac{x(x^2 - 4)}{x + 2} = x(x - 2) \neq 1 \rightarrow x^2 - 2x - 1 \neq 0 \quad (x - 4)(x + 2) \neq 0$$

$$D_f \neq \{-2, 4\} \checkmark$$

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

$$R_f = [1, +\infty) - \{1\}$$

$$f\left(\frac{a+b}{2c}\right) = f\left(\frac{-2+4}{1}\right) = f(1) = -1 \rightarrow f(-1) = 3$$

$$x \in \mathbb{R} \rightarrow \mathbb{R}$$

$$R_f = \sqrt{\mathbb{R}} = \mathbb{R}$$

$$y = \sqrt{(x-2)^3} = \sqrt{x^3 - 6x^2 + 12x - 8}$$

$$R_f = [-1, 1.0]$$

$$a = -6 \quad b = 12 \quad D_f = [-6, 12]$$

$$D_1 = \mathbb{R} - \{1\} = \mathbb{R}_1$$

$$y_1 = \frac{ax^2 - 1}{x^2 + b} \rightarrow x = \pm \sqrt{\frac{by+1}{a-y}} \rightarrow a = 1$$

$$y_1 = \frac{x^2 - 1}{x^2 + b} \rightarrow b = -1$$

$$R_1 = \mathbb{R} - \{-1\} = D_1$$

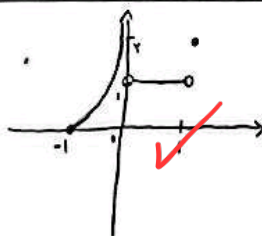
$$a + b = 1 - 1 = 0$$

$$\min \rightarrow 0 \rightarrow \frac{1}{b} = -1 \rightarrow b = -1$$

$$\max \rightarrow \infty \rightarrow a = 1$$

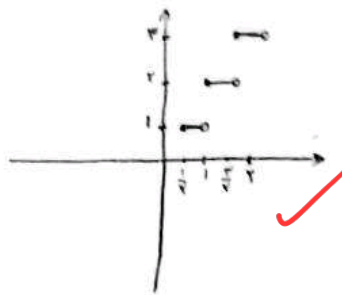
$$a + b = 1$$

$$f(x) = \begin{cases} -1 < x < 0 & -\frac{1}{x} - 1 \\ 0 < x < 1 & 1 \\ x = 1 & 2 \end{cases}$$



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$$f(x) = \begin{cases} \frac{1}{x} & 1 \leq x < 2 \\ 1 & 2 \leq x < 3 \\ \frac{1}{x} & 3 \leq x < 4 \end{cases}$$



با 0, 2

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$$D = \mathbb{R} - \{-\frac{a}{a+b}\} \quad R = \mathbb{R} - \{\frac{1}{a}\}$$

$$|\frac{x+1}{ax+3}| \leq 1 \rightarrow -1 \leq \frac{x+1}{ax+3} \leq 1$$

$$\frac{(1-a)x-2}{ax+3} \leq 0$$

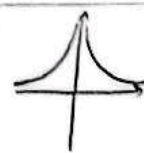
$$0 \leq \frac{(x+1)x+3}{ax+3}$$

$$\left(\left|\frac{a+1}{a+3}\right|\right)^2 < 1$$

$$(x+1)^2 - (ax+3)^2 < 0 \quad a-b=3$$

$$a=1 \quad b=-2$$

$$y = \left|\frac{ax+b}{cx+d}\right| \rightarrow$$



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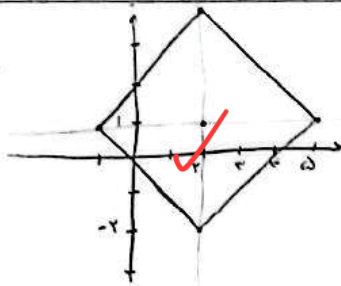
$$|x-2| + |y-1| = 3$$

$$\text{در ربع اول: } x-2+y-1=3 \rightarrow y=-x+6$$

$$\text{در ربع دوم: } -x+2+y-1=3 \rightarrow y=x+2$$

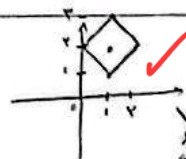
$$\text{در ربع سوم: } -x+2-y+1=3 \rightarrow y=-x$$

$$\text{در ربع چهارم: } x-2-y+1=3 \rightarrow y=x-4$$



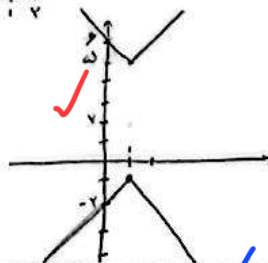
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$$\text{الف) } |x-1| + |y-2| = 1$$



$$\text{ب) } |x-1| - |y-2| = -3$$

$$|y-2| - |x-1| = 3$$



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$$f(x) = \begin{cases} x \geq -\frac{b}{a} & (a+3)x+b \\ x \leq -\frac{b}{a} & (3-a)x+b \end{cases}$$

$$a \geq 0 \quad (3-a)(-\frac{b}{a}) - b \geq (a+3)(-\frac{b}{a}) + b \rightarrow -\frac{3b}{a} \geq -\frac{3b}{a} \rightarrow \frac{b}{a} \leq \frac{b}{a}$$

$$a \leq 0 \quad (3-a)(-\frac{b}{a}) - b \leq (a+3)(-\frac{b}{a}) + b \rightarrow -\frac{3b}{a} \leq -\frac{3b}{a} \rightarrow \frac{b}{a} \geq \frac{b}{a}$$

$$a \neq 0 \quad a \in \mathbb{R} - \{0\}$$

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