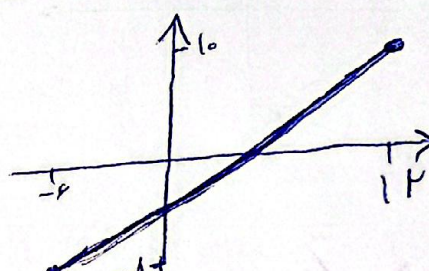


$x=1 \rightarrow 2f(1) = 3 + f(1) \rightarrow f(1) = 1$ و $f(x) = ax + b \rightarrow$
 $2ax + a + 2b + ax + 2a = 3x + 3 \rightarrow 3ax + 3a + 2b = 3x + 3 \rightarrow$
 $a=1$ و $b=0 \rightarrow f(x) = x$ $y = \sqrt{-x^2 + x}$ $\xrightarrow{\text{بنا بر } x} x_{\max} = \frac{1}{2}$
 $y_{\max} = \frac{1}{2} \rightarrow R_f: \sqrt{[-\infty, \frac{1}{2}]} = [0, \frac{1}{2}]$

$f(x) = \frac{(x^2 - 2x)(x+2)}{x+2} \xrightarrow{x \neq -2} f(x) = x^2 - 2x = y \rightarrow$
 $x^2 - 2x - y = 0 \quad x_1, x_2 = \frac{2 \pm \sqrt{4 - 4(-y)}}{2} \rightarrow y \geq -1 \rightarrow C = -1$
 $x^2 - 2x \neq 1 \rightarrow x^2 - 2x - 1 \neq 0 \rightarrow \frac{2 \pm \sqrt{4 + 4}}{2} \rightarrow x \neq 1 \rightarrow \begin{cases} x \neq 1 \\ x \neq -2 \end{cases} \rightarrow \begin{cases} a = -1 \\ b = 1 \end{cases}$
 $f\left(\frac{a+b}{2}\right) = f\left(\frac{-1+1}{2}\right) = f(0) = 0$

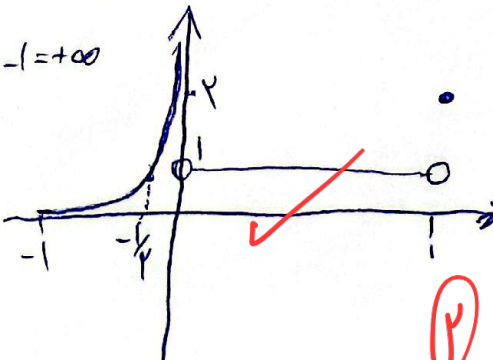
$y = \sqrt[3]{(x-1)^3} = \sqrt[3]{x^3 + 12x - 9x^2 - 1} \rightarrow y = x - 1 \rightarrow b=1$ و $a=-1$
 $D_y = [-1, 1]$ $R_y = [-1, 1]$



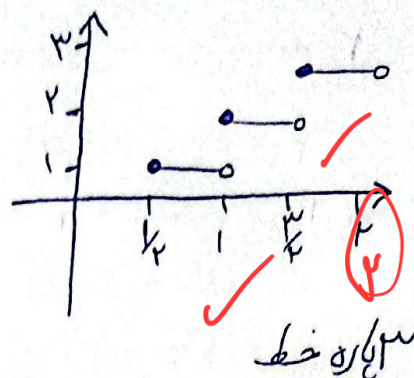
$\sqrt{\frac{x+1}{1-x}} \rightarrow D_y = \mathbb{R} - \{1\} = R_y \rightarrow \frac{ax^2 + b}{x^2 + b} \xrightarrow{x \rightarrow \infty} y = -\frac{1}{b}$
 $R_y = (-\infty, -\frac{1}{b}) \cup (a, +\infty) = \mathbb{R} - [-\frac{1}{b}, a] = \mathbb{R} - \{1\} \rightarrow a = -\frac{1}{b} = 1$
 $\rightarrow a=1$ و $b=-1 \rightarrow a+b = 1-1 = 0$
 $b=1 \quad a+b=2$

در توان های نسبی پایه نباید منفی باشد. $\frac{x+1}{1-x} \rightarrow D_f = [-1, 1)$

$\left[\frac{x}{x}\right] + \left[\frac{x}{x}\right] \begin{cases} x < 0 \\ 0 < x < 1 \\ x = 1 \end{cases} \rightarrow \begin{cases} -1 \\ 0 \\ 1 \end{cases}$
 $\frac{-1}{x} - 1 \xrightarrow{\text{صفر نمی شود}} \frac{-1}{0} - 1 = +\infty$



$$y = [x] + [x + \frac{1}{4}] \begin{cases} 1 & \frac{1}{4} \leq x < 1 \\ 2 & 1 \leq x < \frac{5}{4} \\ 3 & \frac{5}{4} \leq x < 2 \end{cases}$$



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

$$\rightarrow 0 < (a^2 - 1)x^2 + (2a - 2)x + 1 \text{ و } D = (b^2 - 4ac) \xrightarrow{\text{باید باشد که}} a^2 - 1 = 0$$

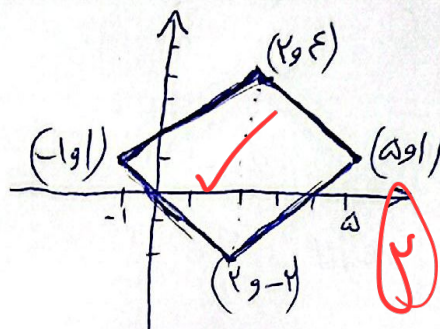
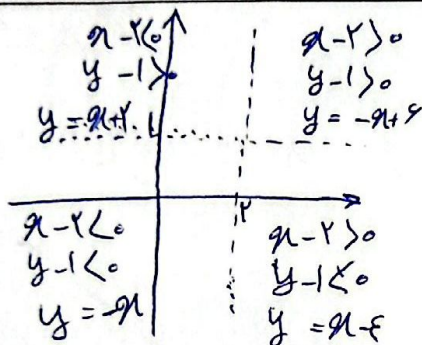
$$\rightarrow a \neq \pm 1 \begin{cases} a = 1 \rightarrow \frac{|x+1|}{|x+1|} < 1 \rightarrow 0 < \varepsilon x + 1 \rightarrow -2 < x \rightarrow b = -2 \\ a = -1 \rightarrow \frac{|x+1|}{|-x-1|} < 1 \rightarrow 1 - x - 1 < 0 \rightarrow x < 0 \end{cases}$$

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

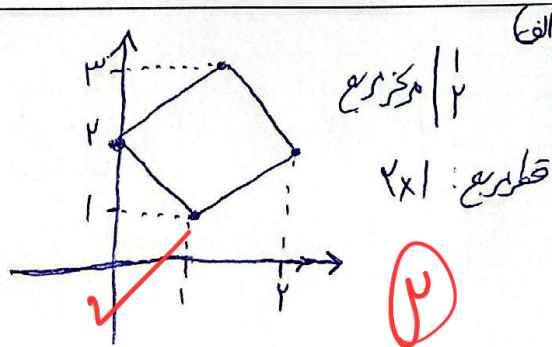
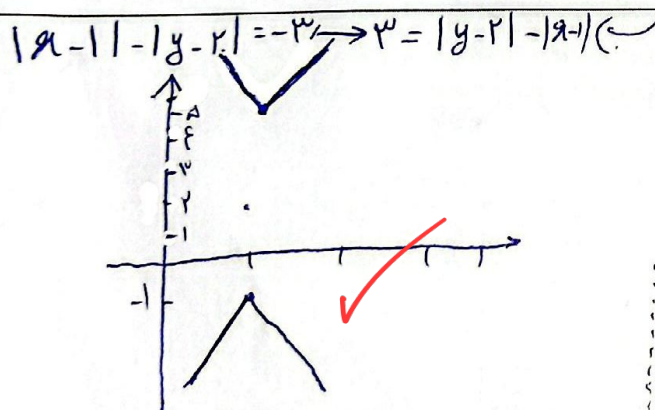
باقی قیود

باقی قیود

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8



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

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

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

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