

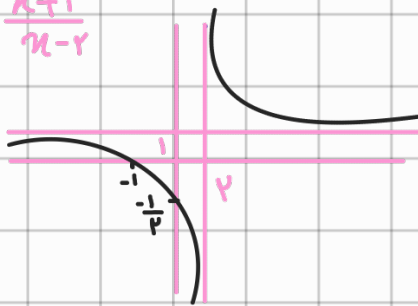
۲۰ (افزایش)

$$y = \frac{x+1}{x-2}$$

داده مقدر اولی

$$y = \frac{|x|+1}{|x|-2}$$

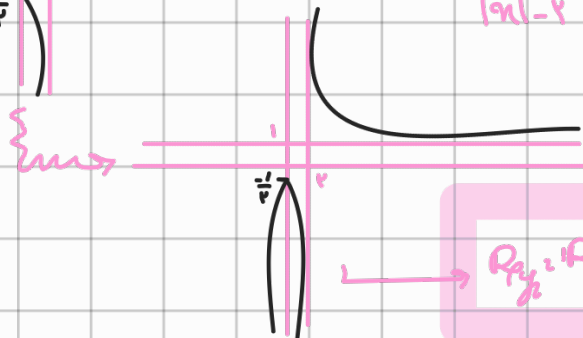
سوال ۴ روسی



$$y = \frac{|x|+1}{|x|-2}$$

اسه اولی

(۲)



$$R_{y_2} = (-\infty, -1) \cup (1, +\infty)$$

$$y = \frac{x^2+1}{|x|} \rightsquigarrow x > 0 \rightsquigarrow \frac{x^2+1}{x} = x + \frac{1}{x} \rightsquigarrow x + \frac{1}{x} \geq 2 \quad (1)$$

$$\rightsquigarrow x < 0 \rightsquigarrow \frac{x^2+1}{-x} = -x + \frac{1}{-x} \rightsquigarrow -x + \frac{1}{-x} \leq -2$$

$$\rightsquigarrow x + \frac{1}{x} \geq 2 \quad (1)$$

$$(1), (2) \rightsquigarrow R_{y_2} = [2, +\infty)$$

$$y = \frac{x^2+2x-2}{x+3} \rightsquigarrow y_2 x + 3y = x^2 + 2x - 2 \rightsquigarrow x^2 + x(2-y) - 2-3y_2 \quad (2)$$

$$\Delta = (2-y)^2 - 4(-2-3y) = y^2 - 4y + 4 + 8 + 12y = y^2 + 8y + 12 = (y+2)(y+4)$$

$$x = \frac{y-2 \pm \sqrt{(y+2)(y+4)}}{2} \rightsquigarrow \begin{matrix} -4 & -2 \\ + & - \end{matrix} \rightsquigarrow R_{y_2} = (-\infty, -4] \cup [2, +\infty)$$

$$y = \frac{x^2-x+\frac{1}{x}}{x^2-x+1}$$

$$x^2-x+1 \neq 0$$

$$1-x|x|=-3 \rightsquigarrow$$

(۲)

$$R_{y_2} = \mathbb{R}$$

$$\Rightarrow yx^2 - yx + y = x^2 - x + \frac{1}{\varepsilon} \Rightarrow x^2(1-y) + x(y-1) + \frac{1}{\varepsilon}y = 0$$

$$\Delta = (y-1)^2 - 4 \times \left(\frac{1}{\varepsilon}y\right)(1-y) = y^2 - 2y + 1 - 4y^2 + 4y = -3y^2 + 2y$$

$\xrightarrow{\text{فصل اول}} -3y^2 + 2y - 1$

$$x = \frac{1-y \pm \sqrt{3y(-y+1)}}{1-2y} \xrightarrow{\Delta=0} \begin{array}{c} 0 \quad 1 \\ - \quad + \quad - \\ 0 \quad 0 \end{array} \left\{ \begin{array}{l} \text{منفی} \\ \Rightarrow R_y = [0, 1) \end{array} \right.$$

$\hookrightarrow 1-2y \neq 0 \rightarrow y \neq \frac{1}{2}$

کدام را انتخاب کنیم

$$y = \sqrt{-x^2 + 4x - 1} \Rightarrow y^2 = -x^2 + 4x - 1 \Rightarrow -x^2 + 4x - 1 - y^2 = 0$$

$$\Rightarrow \Delta = 16 - 4 \times (-1) \times (-1 - y^2) \Rightarrow \Delta = 12 - 4y^2$$

(۲)

$$x = \frac{-4 \pm \sqrt{12 - 4y^2}}{-2} \xrightarrow{\text{مثبت باشد}} \begin{array}{c} -\sqrt{3} \quad \sqrt{3} \\ - \quad + \quad - \\ 0 \quad 0 \end{array} \left\{ \begin{array}{l} \Rightarrow R_y = [0, \sqrt{3}] \\ \text{چون } y \text{ باید 2 کثیرالمرتبه داشته باشد} \\ \text{پس منفی نمی‌تواند باشد} \end{array} \right.$$

$$y = \sqrt{4x^2 - 12x} \Rightarrow y^2 = 4x^2 - 12x \Rightarrow 4x^2 - 12x - y^2 = 0$$

چون

یک صفحه Min داریم پس بردش از ۰ تا +∞ است

$$\Delta = 144 - 4 \times 4 \times (-y^2) = 144 + 16y^2 = 16(9 + y^2)$$

صفحه سخت حلش کردیم

$$x = \frac{3 \pm \sqrt{9 + y^2}}{2} \xrightarrow{\text{مثبت باشد}} \begin{array}{c} -2 \quad 5 \\ - \quad + \quad - \\ 0 \quad 0 \end{array} \Rightarrow R_y = [-2, 5)$$

صفحه آخر...

$$y_2 = \log_{\frac{1}{2}} x^{\frac{1}{2}} - x + 1$$

$$\Rightarrow \text{domain } D_f = (-\infty, +\infty)$$

← domain

$$\Rightarrow D_{y_2} = \mathbb{R}$$

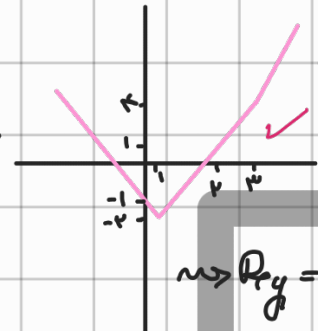
(1)

$$y_2 = \log_{\frac{1}{2}} \frac{x^{\frac{1}{2}} + 1}{x} \xrightarrow{\log \frac{1}{2}} \frac{x^{\frac{1}{2}} + 1}{x} > 0 \Rightarrow x > 0 \Rightarrow x + \frac{1}{x} \geq 2 \quad (1)$$

$$\xrightarrow{(1)} \log_{\frac{1}{2}} \frac{x^{\frac{1}{2}} + 1}{x} \geq \log_{\frac{1}{2}} 2 \Rightarrow y_2 \geq 1 \Rightarrow D_{y_2} = [1, +\infty)$$

$$y_2 = |2x - 4| - |x - 3| \xrightarrow{x \geq 3} x + 1$$

$$3x - 4 \quad 1 \leq x < 3 \Rightarrow -x - 1 \quad x < 1$$



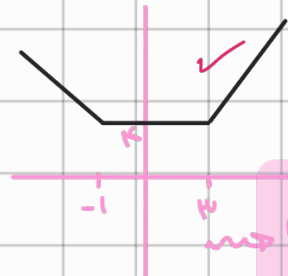
← domain

(1)

$$\Rightarrow D_{y_2} = [-1, +\infty)$$

$$y_2 = |x - 3| + |x + 1| \xrightarrow{x \geq 3} 2x - 2$$

$$x \quad -1 \leq x < 3 \Rightarrow -2x + 2 \quad x < -1$$

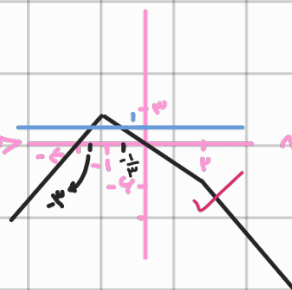


← domain

$$\Rightarrow D_{y_2} = [2, +\infty)$$

$$|x - 2| - |x + 4| \leq 1$$

$$\begin{cases} -x - 2 & x \geq 2 \\ -3x & -1 \leq x < 2 \\ x + 5 & x < -1 \end{cases} \Rightarrow D = (-\frac{3}{2}, \frac{1}{2})$$



$$D = (-\frac{3}{2}, \frac{1}{2})$$

(1)

← domain

$$y_2 = \psi n - |\psi n + 1| + |n| \rightsquigarrow \psi n - 1 \quad n \geq 0$$

$$\begin{matrix} -1 & -\frac{1}{\psi} \leq n < 0 \\ \psi n + 1 & n < -\frac{1}{\psi} \end{matrix}$$

$\rightsquigarrow R_{y_2} = \mathbb{R}$

$$y_2 = [n] + [\psi - n] \rightsquigarrow$$

$R_{y_2} = \{1\}$

$$y_2 = \psi n - [n] \rightsquigarrow$$

$R_{y_2} = [-1, \psi)$

$$y_2 = \sin^2 n - \sin n + 1 \rightsquigarrow y_2 = 1 - 1 + 1 \rightsquigarrow y_2 = 1$$

$$\rightsquigarrow y_2 = 1 + 1 + 1 \rightsquigarrow y_2 = 3$$

$$\rightsquigarrow y_2 = \frac{1}{\psi} - \frac{1}{\psi} + 1 = \frac{2}{\psi}$$

$R_{y_2} = [\frac{2}{\psi}, 3]$

$$y_2 = \sin^k n + \sin^k n + 1 \begin{cases} \xrightarrow{\sin^k n = 1} y = 1 + 1 + 1 \rightarrow y = 3 \\ \xrightarrow{\sin^k n = 0} y = 0 + 0 + 1 \rightarrow y = 1 \\ \xrightarrow{\sin^k n = -\frac{1}{4}} y = -\frac{1}{4} + -\frac{1}{4} + 1 = \frac{1}{2} \end{cases} \rightarrow R_{y_2} = [1, 3]$$

در صورتی که $\sin^k n \neq -\frac{1}{4}$ و $\sin^k n \neq \frac{1}{4}$ در این صورت y_2 در بازه $[1, 3]$ قرار می‌گیرد.

$$\text{ب) } \min \left| \begin{array}{l} -\frac{b}{ka} = 1 \\ y = -1 \end{array} \right. \Rightarrow R_y = \sqrt{[-1, +\infty)} = [-1, +\infty)$$