

بارسا حاتنیری تالیف ۲ ریاضی دوم پسر A

$$1- \begin{cases} f(-n) - n f(n) = 2|n| + 1 \\ f(n) + n f(-n) = 2|-n| + 1 \end{cases} \Rightarrow \begin{cases} n f(-n) - n^2 f(n) = (2|n| + 1) n \\ \oplus \\ -f(n) - n^2 f(-n) = -(2|n| + 1) \end{cases}$$

$$\frac{(-n^2 - 1) f(n)}{-(n^2 + 1)} = \frac{(n-1)(2|n| + 1)}{-(n^2 + 1)}$$

$$\Rightarrow f(n) = \frac{(n-1)(2|n| + 1)}{-(n^2 + 1)}$$

$$2- \stackrel{n=0}{\Rightarrow} 2f(0) = 0 - 0 + 2 = 2 \Rightarrow f(0) = 1 \Rightarrow f(n) = n^2 - 2n + 1$$

$$\Rightarrow f(n^2) = n^4 - 2n^2 + 1$$

$$3- y n - y = n^2 + n + 2 \Rightarrow n^2 + (1-y)n + y + 2 = 0$$

$$\Rightarrow n = \frac{y-1 \pm \sqrt{y^2 - 2y + 1 - 4y - 8}}{2} = \frac{y-1 \pm \sqrt{y^2 - 6y - 7}}{2} \xrightarrow{y^2 - 6y - 7 \geq 0} \frac{y-1 \pm \sqrt{(y+1)(y-7)}}{2}$$

$$\Rightarrow R_y = (-\infty, -1] \cup [7, +\infty)$$

$$4- \text{الف) } y = 2n^2 - 3n + 1 \rightarrow y_s = 2x \times \frac{2d}{1x} - 3x \times \frac{d}{x} + 1 = \frac{-2d}{1} + 1 = \frac{-2d}{1} + 1 = \frac{-2d}{1}$$

$$R_y = \left[\frac{-2d}{1}, +\infty \right)$$

$$\text{ب) } y = \sqrt{-n^2 + 6n - 9} \Rightarrow y = \sqrt{-n^2 + 6n - 9} \Rightarrow y = \sqrt{-(n-3)^2 + 0} \Rightarrow y = \sqrt{-(n-3)^2}$$

$$\stackrel{\text{if:}}{\Rightarrow} A = -(n-3)^2 \Rightarrow R_A = (-\infty, 0] \Rightarrow R_y = [0, 0]$$

$$\text{ج) } y = \sqrt{n^2 - 2n^2 + 4n + 1} \stackrel{\text{if:}}{\Rightarrow} A = n^2 - 2n^2 + 4n + 1 \Rightarrow R_A = \mathbb{R}$$

$$\Rightarrow R_y = [0, +\infty)$$

$$\text{د) } y = \log \left(\frac{n^2 - 4n^2 + 6n + 1}{1} \right) = A \Rightarrow A > 0$$

$$\Rightarrow R_y = (-\infty, +\infty) = \mathbb{R}$$

$$\text{هـ) الف) } y = \frac{2n+1}{2n-5} \Rightarrow R_y = \mathbb{R} - \left\{ \frac{5}{2} \right\} \quad (\text{مستوراً نیست})$$

$$\text{ب) } y = \sqrt{\frac{2n+1}{2n-5}} = A \Rightarrow R_A = \mathbb{R} - \left\{ \frac{5}{2} \right\} \Rightarrow R_y = [0, +\infty) - \left\{ \frac{5}{2} \right\}$$

$$\text{ج) } y = \sqrt{n^2 + 4} + \frac{1}{\sqrt{n^2 + 4}} \stackrel{\sqrt{x} + \frac{1}{\sqrt{x}} \geq \sqrt{4}}{\Rightarrow} y \geq \sqrt{4} + \frac{1}{\sqrt{4}} \Rightarrow y \geq \frac{5}{2}$$

$$\Rightarrow R_y = \left[\frac{5}{2}, +\infty \right)$$

$$\text{د) } y = n^2 + 4 + \frac{1}{n^2 + 4} - 4 \stackrel{n^2 + 4 \geq 4}{\Rightarrow} y \geq 4 + \frac{1}{4} - 4 \Rightarrow y \geq \frac{1}{4} \Rightarrow R_y = \left[\frac{1}{4}, +\infty \right)$$

بار اول جابجایی متغیر x و y دوازدهم پسر

$$4- \text{ روش اولی: } y = \frac{x^2 + 2}{x^2 - 1} \Rightarrow yx^2 - y = x^2 + 2 \Rightarrow 2x^2 - yx^2 + 2 + y = 0$$

$$\Rightarrow (2-y)x^2 + y + 2 = 0 \Rightarrow x = \frac{0 \pm \sqrt{4(2-y)(y+2)}}{2(2-y)} \Rightarrow y \in (-\infty, -2] \cup (2, +\infty)$$

$2(2-y) \rightarrow y \neq 2$

روش دیگری

$$\min x^2 = 0 \rightarrow y = \frac{2}{-1} = -2$$

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

معرفی $n+1$ می تواند مفید شود

$$R_y = (-\infty, -2] \cup (2, +\infty)$$

$$5- f(x) = \frac{2 \sin x + 2}{\sin x - 2}$$

$\min \sin x = -1 \rightarrow f(x) = \frac{2}{-1} = -2$

$\max \sin x = 1 \rightarrow f(x) = \frac{4}{-1} = -4$

معرفی n می تواند مفید شود

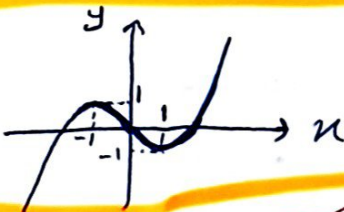
$$R_f = [-4, -2]$$

$$6- \text{ الف) } y = \left| \frac{x-1}{x} \right|$$

$$g(x) = \frac{x-1}{x} \Rightarrow R_g = \mathbb{R} - \left\{ \frac{1}{x} \right\}$$

$$\Rightarrow R_y = [0, +\infty) - \left\{ \frac{1}{x} \right\}$$

$$ب) y = \sqrt{\frac{g(x-2)}{x(x-2)}} = \sqrt{\frac{g}{x}} = \frac{x}{x} \Rightarrow R_y = \left\{ \frac{x}{x} \right\}$$

$$9- y = \begin{cases} x^2 - 2x & x \geq 0 \\ -x^2 - 2x & x < 0 \end{cases}$$


$$\Rightarrow R_y = \mathbb{R}$$

$$10- y = f(|x|)$$

$$y = f(|x|) + 1$$

$$y = |f(|x|) + 1|$$

