

$$\begin{cases} -n \cdot (f(-n) - n f(n)) = r|n| + 1 \\ f(n) + n f(-n) = r|n| + 1 \end{cases} \quad \text{سوال 1: 1}$$

$$\Rightarrow (n^r + 1) f(n) = r|n| + 1 + n r|n| + n$$

$$\Rightarrow f(n) = \begin{cases} \frac{r n^r + r n + 1}{n^r + 1} & n > 0 \\ \frac{-r n^r + r n + 1}{n^r + 1} & n < 0 \end{cases}$$

$$f(0) = 1 \Rightarrow f(0) = r \Rightarrow f(n) = n^r - r n + r \quad \text{سوال 2: 1}$$

$$\Rightarrow f(n) = n^r - r n^r + r$$

$$y = \frac{n^r + n + r}{n - 1} \Rightarrow y n - y = n^r + n + r \quad \text{سوال 3: 1}$$

$$\Rightarrow n^r + (1 - y)n + r + y$$

$$(1 - y)^r - 1 - r y \geq 0 \Rightarrow y^r - r y + 1 - 1 - r y = y^r - 2r y - 1 \geq 0$$

$$(-\infty, -1] \cup [1, +\infty) \subseteq \frac{-1}{+1 - 1 +}$$

سوال 4: 1

$$x_0 = \frac{-b}{r a} = \frac{0}{r} \rightarrow y_0 = \frac{-1}{r} \Rightarrow R_y = \left[\frac{-1}{r}, +\infty \right) \quad \text{الف}$$

Date

Subject

$$\text{ب) } \frac{-4}{-2} = 2 \Rightarrow \sqrt{-9 + 12 - 4} = 2 \\ \Rightarrow R_y = [0, 2]$$

$$\text{ج) } R_y = [0, +\infty)$$

$$\text{د) } R_y = \mathbb{R}$$

سوال ٥:

$$\text{الف) } R_y = \mathbb{R} - \left\{ \frac{1}{2} \right\} \quad \text{ب) } [0, +\infty) - \left\{ \frac{1}{2} \right\}$$

$$\text{ج) } y = \sqrt{x^2 + 4} + \frac{1}{\sqrt{x^2 + 4}} \Rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} = \frac{x}{\sqrt{x}} \\ \Rightarrow R_y = \left[\frac{x}{\sqrt{x}}, +\infty \right)$$

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

$$y = \frac{x^2 + 4}{x^2 - 1} \quad x \rightarrow 0 \Rightarrow -4 \quad x \rightarrow +\infty \Rightarrow 1 \\ \text{سوال ٦: مخرج ٥ متغير است} \quad \hookrightarrow R_y = [-4, 1) \cup (1, +\infty)$$

$$(x - y)(x^2 + 4 + y) = 0 \Rightarrow -2(x - y)(x + y) \geq 0$$

$$y \neq 0 \Rightarrow R_y = \mathbb{R} - (-4, 1] \Rightarrow R_y = \mathbb{R} - (-4, 1]$$

$$y = 0 \Rightarrow y = -4$$

$$\begin{aligned} \text{Sinh } \eta &\rightarrow -1 \rightarrow \frac{r}{-r} = -\frac{1}{r} \\ &\rightarrow 1 \rightarrow \frac{r}{-r} = -r \end{aligned}$$

سوال ١٧: خروجی نهایی ریس
 $\Rightarrow [-r, -\frac{1}{r}]$

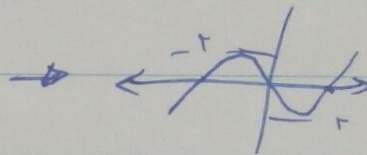
سوال ١٨:

الف) $y = \left| \frac{r_{n-1}}{r_n} \right| \Rightarrow R_f = \mathbb{R} - \left\{ \frac{r}{r} \right\} \Rightarrow [0, +\infty) - \left\{ \frac{r}{r} \right\}$

ب) $y = \sqrt{\frac{r(n-1)}{r(n-1)}} = \frac{r}{r} \Rightarrow R_f = \left\{ \frac{r}{r} \right\}$

سوال ١٩:

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



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

سوال ٢٠:

$$f(n) + 1 \Rightarrow \text{graph} \Rightarrow \text{graph}$$

$|f(n-1) + 1|$