

فنا طبع سنجی - دوازدهم ریاضی A - تکلیف شماره 4

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

$$f(n) + n f(-n) = 2|n| + 1 \quad (2)$$

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

$$f(n) = \frac{(1-n)(2|n|+1)}{n^2+1} \begin{cases} n \geq 0 & \frac{-2n^2+n+1}{n^2+1} \\ n < 0 & \frac{2n^2-3n+1}{n^2+1} \end{cases}$$

$$n=0 \rightarrow f(0) = 1 \Rightarrow f(0) = 1$$

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

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

$$\Delta = (1-y)^2 - 4(1-y) = y^2 + 1 - 2y - 4 + 4y = y^2 - 2y - 3$$

$$n = \frac{y-1 \pm \sqrt{y^2-2y-3}}{2} \quad y^2-2y-3 \geq 0 \Rightarrow (y-3)(y+1) \geq 0 \Rightarrow y \in (-\infty, -1] \cup [3, +\infty)$$

$$\text{الف) } \left| \frac{a}{\varepsilon} \right| \leq \frac{a}{\varepsilon} \rightarrow R_f = \left[-\frac{\sqrt{\varepsilon}}{14}, +\infty \right) \cup \left[-\frac{1}{\sqrt{\varepsilon}}, +\infty \right)$$

$$\text{ب) } \lim_{n \rightarrow \infty} f(n) = -\infty \Rightarrow R_f = (-\infty, \varepsilon] = [0, 1]$$

$$\text{ج) } g(n) = n^2 - 3n^2 + 1 \rightarrow \lim_{n \rightarrow \infty} g(n) = -\infty \Rightarrow R_g = \mathbb{R} \Rightarrow R_f = \sqrt{12} = [0, +\infty)$$

$$\text{د) } R_f = \mathbb{R} \cup (-\infty, +\infty) \Rightarrow R = \mathbb{R} \cup (-\infty, +\infty)$$

الف) $\frac{x^{n+1}}{x^2-9} = y \Rightarrow yx^2 - 9y = x^{n+1} \Rightarrow x(2y-3) = \frac{9y+1}{y-5} \Rightarrow R_f = \mathbb{R} - \left\{ \frac{3}{2} \right\}$
 ب) $\text{مربع بدون راديكال} = \mathbb{R} - \left\{ \frac{a}{c} \right\} = \mathbb{R} - \left\{ \frac{1}{2} \right\} \Rightarrow R_f = (-\infty, +\infty) - \left\{ \frac{1}{2} \right\}$ [C]

ج) $\frac{x^2+3}{\sqrt{x^2+3}} + \frac{1}{\sqrt{x^2+3}} = \sqrt{x^2+3} + \frac{1}{\sqrt{x^2+3}} \xrightarrow{\text{مقادير } a} \frac{a+\frac{1}{a}}{a \geq 0} \rightarrow \text{كثيرات} = \sqrt{x^2+3} + \frac{1}{\sqrt{x^2+3}} = \frac{x}{\sqrt{x^2+3}} \Rightarrow$
 $\Rightarrow \min = \frac{1}{2} \Rightarrow R_f = \left[\frac{1}{2}, +\infty \right)$ [D]

$\frac{x^2n^2+3}{n^2+1} = y \rightarrow yx^2 - y + x^2n^2 + 3 \rightarrow (y-3)x^2 = 3+y \Rightarrow x = \sqrt{\frac{3+y}{y-3}} \geq 0$
 $\frac{-3}{-1-3} \rightarrow R_f = (-\infty, -3] \cup [3, +\infty)$ [E]

تذكر: 2 = دوسر مربع (ن) رابع صي دهم
 $x^2 \rightarrow y = -3 \quad \left\{ (-\infty, -3] \cup [3, +\infty) \right.$
 $x^2 = +\infty \rightarrow y = 3$
 مخرج 0 $\rightarrow x^2 = 1 \rightarrow x = \pm 1$

$\min \sin = -1$
 $\sin = 0 \rightarrow \frac{2(-1)+3}{-1-3} = \frac{-2}{-4} = \frac{1}{2}$
 $\sin = 1 \rightarrow \frac{2+3}{1-3} = \frac{5}{-2} = -\frac{5}{2}$
 $\Rightarrow R_f = \left[-\frac{5}{2}, \frac{1}{2} \right]$ [F]

الف) $y = \frac{x}{x}$ $R_f = \mathbb{R} \setminus \left\{ \frac{3}{2} \right\}$ [A]

ب) $\sqrt{\frac{a(x-2)}{x(x-2)}} = \sqrt{\frac{a}{x}} = \pm \frac{3}{2} = R_f$

ج) $\begin{cases} x \geq 0; & x^2 - 2x \\ x < 0; & -x^2 - 2x \end{cases}$

 $R_f = [-1, +\infty)$ [B]

د) $f(|x|) =$

 $f(|x|) + 1$

 جواب [C]