

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره: کلاس: و/یا: درس:

$$\begin{aligned}
 -n &\rightarrow \left\{ \begin{aligned} f(n) + n f(-n) &= 2|n| + 1 \\ f(-n) - n f(n) &= 2|n| + 1 \end{aligned} \right. \\
 n &\rightarrow \left\{ \begin{aligned} f(-n) - n f(n) &= 2|n| + 1 \Rightarrow f(-n) = n f(n) + 2|n| + 1 \\ \Rightarrow f(n) + n [n f(n) + 2|n| + 1] &= 2|n| + 1 \Rightarrow (1+n^2) f(n) + 2n|n| + n \\ &= 2|n| + 1 \Rightarrow f(n) = \frac{2|n| + 1 - 2n|n| - n}{n^2 + 1} \Rightarrow \begin{cases} \frac{-2n^2 + n + 1}{n^2 + 1} & n \geq 0 \\ \frac{2n^2 + 3n + 1}{n^2 + 1} & n < 0 \end{cases}
 \end{aligned} \right.
 \end{aligned}$$

$$n=0 \rightarrow 2f(0)=6 \Rightarrow f(0)=3$$

$$f(n) = n^2 - 3n + 3 \Rightarrow f(n^2) = n^4 - 3n^2 + 3$$

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

$$\Delta \geq 0 \Rightarrow (1-y)^2 - 4(y+2) \geq 0 \Rightarrow y^2 - 6y - 7 \geq 0$$

$$\Rightarrow (y-7)(y+1) \geq 0$$

$$\begin{array}{c} -1 \quad 7 \\ + \quad | \quad - \quad | \quad + \end{array} \Rightarrow R_f = (-\infty, -1] \cup [7, +\infty)$$

$$\text{الف) } \frac{-b}{2a} = \frac{0}{2} = 0 \xrightarrow{x=0} y = -\frac{2}{19} = -\frac{14}{19} \Rightarrow R_f = [-\frac{14}{19}, +\infty)$$

$$\text{ب) } \frac{-b}{2a} = \frac{-6}{-2} = 3 \xrightarrow{x=3} y = 7 \Rightarrow R_f = (-\infty, 7] \Rightarrow R_f = [7, +\infty)$$

$$\text{ج) } \int n^2 - 3n^2 + 3n + 1 \rightarrow R_f = \mathbb{R} \Rightarrow R_f = [0, +\infty)$$

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

$$\text{الف) } \text{همواره مثبت} \rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \Rightarrow R_f = \mathbb{R} - \left\{ \frac{3}{2} \right\}$$

$$\text{ب) } \text{شماره منفی} \Rightarrow n = -\frac{-2y-1}{y-4} \Rightarrow n = \frac{2y+1}{4-y} \Rightarrow R_f = \mathbb{R} - \{4\}$$

$$\text{ج) } y = \sqrt{n^2 + 3} + \frac{1}{\sqrt{n^2 + 3}} \xrightarrow{a + \frac{1}{a} \geq 2} R_f = [0, +\infty) - \{2\}$$

$$\text{د) } y \geq 4 \rightarrow \frac{1}{n^2 + 3} \geq 4 - y \Rightarrow R_f = [4, +\infty)$$

$$y_{\min} \rightarrow 4 + \frac{1}{4} - 4 = \frac{1}{4} \Rightarrow R_f = \left[\frac{1}{4}, +\infty \right)$$

1) $y = n^2$ $y = n^2 - y = 2n^2 + 2$ $\Rightarrow (y-2)n^2 = y+2$ $\Rightarrow n^2 = \frac{y+2}{y-2}$ $\xrightarrow{n^2 \geq 0} \frac{y+2}{y-2} \geq 0$ $\Rightarrow R_f = (-\infty, -2] \cup (2, +\infty)$	2) $\square = n^2$ $\frac{a}{c} = \frac{1}{1} = 1 \quad \lambda = 0 \Rightarrow \frac{b}{d} = -2$ $n^2 = 1 \Rightarrow x \in (-\infty, -1] \cup [1, +\infty)$
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$y \sin x + 2 = y(\sin x - 2) + 10 \Rightarrow f(x) = \frac{y(\sin x - 2) + 10}{\sin x - 2}$ $\Rightarrow f(x) = y + \frac{10}{\sin x - 2} \quad -1 \leq \sin x \leq 1$ $\frac{10}{-1} \leq \frac{10}{\sin x - 2} \leq \frac{10}{-2} \Rightarrow -10 \leq \frac{10}{\sin x - 2} \leq -5$ $-10 + y \leq f(x) \leq -5 + y \Rightarrow -2 \leq f(x) \leq -1$ $R_f = [-2, -1]$	3) $x = -\frac{1}{2y-2}$ $\Rightarrow x = \frac{-1}{2-y} \rightarrow R_f = \mathbb{R} \setminus \{2\}$ $\Rightarrow R_f = [0, +\infty)$
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4) $y = \sqrt{\frac{9(n-2)}{16(n-2)}}$ $\Rightarrow y = \sqrt{\frac{9}{16}} = \frac{3}{4}$ $R_f = \left\{ \frac{3}{4} \right\}$	5) $y = n^2 - 2n \quad \frac{-b}{2a} = \frac{1}{2} \rightarrow R_f = [-1, +\infty)$ $y = -n^2 - 2n \quad \frac{-b}{2a} = -1 \rightarrow R_f = (-\infty, 1]$ الاجابة: $(-\infty, 1] \cup [-1, +\infty) \rightarrow R_f = \mathbb{R}$
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6) $y = f(x) + 1$ Graphs showing the function $y = f(x) + 1$ and its range $R_f = \mathbb{R}$.	7) $y = f(x) + 1$ Graphs showing the function $y = f(x) + 1$ and its range $R_f = \mathbb{R}$.
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