

۱۹ آزمون

$t = \sqrt{x-4}$ $f(x) = \sqrt{t^2 + 4t + 4} = t + 2$ $g(x) = \sqrt{t^2 - 4t + 4} = t - 2$ $f + g = 2t = 2\sqrt{x-4}$ $a=0 \quad b=2 \quad c=-4$	۱
$f(x) = -x$ $\frac{g(x)}{f(x)} = \frac{1}{-x} = -\frac{1}{x}$ $f(0) = \frac{x}{x}$ $\frac{g(0)}{f(0)} = \frac{f}{\frac{x}{x}} = y$ $x=1, 3 \rightarrow f=0$ $\frac{g}{f} = \left\{ \left(1, -\frac{1}{x}\right), (0, 4) \right\}$	۲
$f(x) = \left\{ \left(\frac{1}{x}, x\right), \left(\frac{x}{x}, -1\right), (x, x), \left(-\frac{1}{x}, x\right) \right\}$ $f(x) = \left\{ (-1, x), (1, x), (-\sqrt{x}, -1), (\sqrt{x}, -1), (-x, x), (x, x) \right\}$ $x^2=1 \Rightarrow x=\pm 1$ $x=1 \rightarrow \frac{x}{-1} = -x$ $x=3 \rightarrow \frac{x}{-1} = -1$ $x=-1 \rightarrow \frac{x}{0} = \infty$ $\frac{xf}{g} = \left\{ (1, -x), (x, -1) \right\}$ $g(x) = \left\{ (x, x), (1, x), (x, 9), (-1, 1) \right\}$	۳
$x=2, 3, -2$ $h(x) = x(1) + x = \omega$ $h(x) = x(1) + x = \omega$ $h(-2) = x(0) + 4 = 4$ $h = \left\{ (x, \omega), (x, \omega), (-2, 4) \right\}$	۴
$\sqrt{x-4} - x \geq 0 \rightarrow 0 < x \leq 4$ $x \neq 2$ $\frac{x}{x+1}$ $g+1 \neq 0$ $g \neq -1$ $x \in \mathbb{Z}$ $g(x) = [x] + [-x] \rightarrow x \in \mathbb{Z} \quad g(x) = 0$ $x \notin \mathbb{Z} \quad g(x) = -1$ $[0, 3] - \{2\}$ $= 0 \cup \{0, 1, 3\}$	۵

$$f(x) = (1, 0), (2, \sqrt{3}), (4, 0), (5, 0)$$

$$h(x) = (1, 0), (2, \frac{\sqrt{3}}{2}), (4, 0)$$

د

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$$الف) R = \mathbb{R}$$

چون معادله درجه ۳ است.

باید با روش اسنیر در این مسئله آوری!

$$ب) y = \frac{1}{x^2 - 2x} \Rightarrow x^2 - 2x = (x-1)^2 - 1$$

$$R = (-\infty, -1] \cup (0, 4 \text{ یا } \infty)$$

$$y = \frac{1}{(x-1)^2 - 1} \Rightarrow y((x-1)^2 - 1) = 1$$

$$yx^2 - 2yx - 1 = 0 \quad \Delta \geq 0 \Rightarrow (-2y)^2 - 4(y)(-1) \geq 0$$

$$4y^2 + 4y \geq 0 \Rightarrow 4y(y+1) \geq 0 \Rightarrow y \leq -1 \text{ یا } y \geq 0$$

۱, ۲, ۵

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$$الف) \lambda = \frac{E}{F} = 2 \quad F = f(r) = -E + 10 = 6$$

$$R = [4, +\infty)$$

$$ب) \lambda_5 = \frac{-9}{-3} = 3 \quad -9 + 18 + 3 = 12$$

$$R = (-\infty, 12]$$

$$ج) \frac{+E}{F} = 2 \quad F = 8 - 3 = -5$$

$$R = [0, +\infty)$$

$$د) \lambda = \frac{-9}{-3} = 3 \quad R : [0, \sqrt{3}]$$

$$4(x) - x^2 = 9 \rightarrow R_f = \sqrt{(-\infty, 9]} = [0, 3]$$

۱, ۷, ۵

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$$الف) R = \mathbb{R}$$

$$ب) R = \mathbb{R}$$

د

$$ج) R = [0, +\infty)$$

$$د) R = [0, +\infty)$$

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$$الف) R = \mathbb{R} - \{3\}$$

$$ب) R = \mathbb{R} - \{2\}$$

د

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(الف) $y = n^3 - 3n^2 + 2n - 1 + 1 = y = (n-1)^3 + 1$ (V)

$$y-1 = (n-1)^3 \rightarrow \sqrt[3]{y-1} = n-1 \rightarrow n = \sqrt[3]{y-1} + 1$$

$R_f = \mathbb{R}$

(ب) $y = \frac{1}{n^2 - 2n} \rightarrow n^2 y - 2n y = 1 \rightarrow n^2 y - 2ny - 1 = 0$

$y \neq 0 \rightarrow n = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 4y(y+1) \geq 0 \rightarrow \frac{-1}{+} \frac{0}{-} \frac{0}{+}$

$y = 0 \rightarrow 0 = 1 \times$ صفتی وجود ندارد! $\rightarrow R_f = (-\infty, -1] \cup (0, +\infty)$

٨- الف) $y = n^2 - 2n + 1 \rightarrow \min \begin{cases} n = \frac{2}{2} = 1 \\ y = 1 - 2 + 1 = 0 \end{cases} \rightarrow R_f = [0, +\infty)$

٨- ب) $y = -n^2 + 4n + 3 \rightarrow \max \begin{cases} n = \frac{-4}{-2} = 2 \\ y = -9 + 8 + 3 = 2 \end{cases} \rightarrow R_f = (-\infty, 2]$

٨- ج) $y = n^2 - 2n - 3 \rightarrow \min \begin{cases} n = \frac{2}{2} = 1 \\ y = 1 - 2 - 3 = -4 \end{cases} \rightarrow R_f = \sqrt{[-4, +\infty)} = [-2, +\infty)$

٨- د) $y = 4n - n^2 \rightarrow \max \begin{cases} n = \frac{-4}{-2} = 2 \\ y = 8 - 4 = 4 \end{cases} \rightarrow R_f = \sqrt{(-\infty, 4]} = (-\infty, 2]$