

ارسطو ایستاد / همسر B

$$f(x) \Rightarrow \sqrt{x + \sqrt{x-4}} \Rightarrow \sqrt{(\sqrt{x-4} + 2)^2} \xrightarrow{x \geq 4} \sqrt{x-4} + 2 \quad -1$$

$$g(x) \Rightarrow \sqrt{x-4} \sqrt{x-4} \Rightarrow \sqrt{(\sqrt{x-4} - 2)^2} \xrightarrow{x \geq 4} \sqrt{x-4} - 2 \quad -\frac{1}{2}$$

$$f(x) + g(x) = a + b\sqrt{x+c} = 0 + 2\sqrt{x-4} \Rightarrow \left. \begin{matrix} a=0 \\ b=2 \\ c=-4 \end{matrix} \right\} \frac{a+b}{c} = \frac{2}{-4} = -\frac{1}{2}$$

$$\frac{g}{f} = \left\{ \left(2, \frac{1}{-4} \right), \left(0, \frac{-4}{2} \right) \right\}$$

$$\frac{2+2}{2-4+4} = -1$$

$$f(x) = \frac{x+2}{x^2-4} \Rightarrow x^2 - (x+2) \neq 0 \Rightarrow (x-2)(x-1) \Rightarrow x \neq 1, 2$$

$$f(2x) = \left\{ \left(\frac{1}{2}, 2 \right), \left(\frac{x}{2}, -1 \right), (2, 2), \left(-\frac{1}{2}, 2 \right) \right\}$$

$$f(x^2) = \left\{ (1, 2), (\sqrt{2}, -1), (2, 2), \left(\frac{1}{\sqrt{2}}, 2 \right) \right\} = \left\{ (1, 2), (\sqrt{2}, -1), (2, 2) \right\}$$

$$2g^2(x)+1 = \left\{ (-2, 1), (1, 3), (2, 9), (-1, 1) \right\}$$

$$\frac{2f}{g} = \left\{ \left(1, \frac{2}{-1} \right), \left(-1, \frac{2}{1} \right), \left(2, \frac{-2}{2} \right) \right\} = \left\{ (1, -2), (2, -1) \right\}$$

$$h = 2f + g = \left\{ (2, 0), (3, 0), (-2, 4) \right\}$$

$$f(x) = \frac{\sqrt{2x} - x}{x-2} \Rightarrow x \neq 2 \quad \left(\frac{f}{g+1} \right)(x) \Rightarrow g \neq -1 \Rightarrow [x] + [-x] = 0$$

$$g(x) = [x] + [-x]$$

$$\Rightarrow D_g = \mathbb{Z}$$

$$D_f \Rightarrow \left. \begin{matrix} \sqrt{2x} - x \geq 0 \\ x \geq 0 \\ x \neq 2 \end{matrix} \right\} D_f = [0, 2] - \{2\}$$

$$\Rightarrow D\left(\frac{f}{g+1}\right) = \{0, 1, 2\}$$

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$$f(n) = \sqrt{4n - n^2 - 4} \Rightarrow -(n^2 - 4n + 4) \geq 0 \Rightarrow -(n^2 - 4) \geq 0$$

$$\begin{array}{c} 1 \quad 4 \\ - \quad + \quad - \end{array} \Rightarrow Df = [1, 4]$$

$$h(n) = \frac{f(n)}{g(n)} = \left\{ (1, 0), \left(2, \frac{\sqrt{2}}{2} \right), (4, 0) \right\}$$

$$\sqrt{16 - 4 - 4} = \sqrt{8}$$

الف) $y = n^3 - 3n^2 + 3n = n^3 - 3n^2 + 3n - 1 + 1 = (n-1)^3 + 1 \Rightarrow y-1 = (n-1)^3$
 $\Rightarrow \sqrt[3]{y-1} = n-1 \Rightarrow \sqrt[3]{y-1} + 1 = n \Rightarrow R_y = \mathbb{R}$

ب) $y = \frac{1}{n^2 - 2n} \Rightarrow y = \frac{1}{n^2 - 2n + 1 - 1} \Rightarrow y = \frac{1}{(n-1)^2 - 1} \Rightarrow y^2((n-1)^2 - 1) = 1$
 $\Rightarrow (n-1)^2 - 1 = \frac{1}{y} \Rightarrow (n-1)^2 = \frac{y+1}{y} \Rightarrow n = \sqrt{\frac{y+1}{y}} + 1$
 $\Rightarrow \frac{y+1}{y} \geq 0 \Rightarrow \begin{array}{c} -1 \quad 0 \\ + \quad - \quad + \end{array} \Rightarrow R_y = (-\infty, -1] \cup (0, +\infty)$

الف) $y = n^2 - 4n + 4$ ext / $\frac{1}{4} \Rightarrow R = [4, +\infty)$
 ب) $y = -n^2 + 4n + 3$ ext / $\frac{1}{4} \Rightarrow R = \mathbb{R} \setminus (-\infty, 12]$
 ج) $y = \sqrt{n^2 - 4n - 3}$ ext / $\frac{1}{4} \Rightarrow R = [0, +\infty)$
 د) $y = \sqrt{4n - n^2}$ ext / $\frac{1}{4} \Rightarrow R = [0, 2]$

الف) $R_y = \mathbb{R}$ ب) $R_y = \mathbb{R}$ ج) $R_y = [0, +\infty)$
 د) $R_y = [0, +\infty)$

الف) $y = \frac{2n+1}{n-2}$ $R_y = \mathbb{R} - \{2\}$

ب) $y = \frac{2n+1}{n+1}$ $R_y = \mathbb{R} - \{2\}$