

$$f(x) = \sqrt{(\sqrt{x-4}+2)^2} \quad g(x) = \sqrt{(\sqrt{x-4}-2)^2}$$

$$f(x) + g(x) = a + b\sqrt{x+c} \rightarrow |\sqrt{x-4}+2| + |\sqrt{x-4}-2|$$

$$\text{چون } \sqrt{x-4}+2 + \sqrt{x-4}-2 \rightarrow 2\sqrt{x-4} = a + b\sqrt{x+c}$$

$$\frac{a+b}{c} \rightarrow \frac{2}{-4} = -\frac{1}{2} \rightarrow a=2, b=2, c=-4$$

$$f(x) = \{(2, -4), (0, \frac{2}{\sqrt{2}})\}$$

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

$$\text{الف) } f(x) \rightarrow \{(\frac{1}{4}, 2), (\frac{3}{4}, -1), (2, 2), (-\frac{1}{4}, 4)\}$$

$$\text{ب) } f(x^2) \rightarrow \{(1, 2), (\sqrt{3}, -1), (2, 2), (-1, 2), (-\sqrt{3}, -1), (-2, 2)\}$$

$$\text{ج) } g(f(x)+1) \rightarrow \{(-2, 9), (1, 9), (3, 9), (-1, 1)\}$$

$$\text{د) } \frac{f}{g} \rightarrow \{(1, -4), (3, -1)\}$$

$$h = 2f + g \rightarrow 2f \rightarrow (2, 2), (3, 2), (4, 1), (2, 0)$$

$$\rightarrow \{(2, 5), (3, 5), (-2, 4)\}$$

$$\text{I) } \left(\frac{f}{g+1}\right)(x) \rightarrow \text{مخرج نباید صفر شود} \rightarrow \text{مخرج صفر شود}$$

$$\text{II) } x_2 \rightarrow (x_2), x \neq 2 \rightarrow \text{مخرج صفر شود} \rightarrow g(x) = 0 \text{ if } x \in \mathbb{R}$$

$$\text{III) } \sqrt{x} - x \geq 0 \rightarrow \sqrt{x} \geq x \rightarrow x \geq x^2$$

$$[0, 1] \quad x^2 - x \leq 0 \rightarrow x(x-1) \leq 0$$

$$I \cap II \cap III \rightarrow \{0, 1, 3\}$$

$f(n) \rightarrow \{(1,0), (2, \sqrt{2}), (4,0)\}$ $h(n) = \frac{f(n)}{g(n)} = \{(1,0), (2, \frac{\sqrt{2}}{2}), (\cancel{4}, 0)\}$	6
الف) $\mathbb{R}$ $(n-1)^3 + 1 \geq y$ $y-1 \geq (n-1)^3$ $n-1 = \sqrt[3]{y-1} \rightarrow n = 1 + \sqrt[3]{y-1}$ $R_f = \mathbb{R}$	7
$y^2 - 2yn + 1 = 0 \rightarrow y^2 - 2yn - 1 = 0$ $n = \frac{2y \pm \sqrt{4y^2 + 4}}{2} \rightarrow 4y^2 + 4 \geq 0$ $y^2 + 1 \geq 0$ $R_f = (-\infty, -1] \cup [0, +\infty)$	8
الف) $\min \rightarrow \sqrt[n]{n} \rightarrow \frac{f}{x} = 2 \rightarrow \sqrt[n]{n} = 2 \quad R_f = [4, +\infty)$ ب) $\max \rightarrow \sqrt[n]{n} \rightarrow \frac{-2}{-2} = 1 \rightarrow \sqrt[n]{n} = 1 \quad R_f = (-\infty, 1]$ ج) $\min \rightarrow \sqrt[n]{n} \rightarrow \frac{f}{x} = 2 \rightarrow \sqrt[n]{n} = -1 \rightarrow [-1, +\infty) \cup [0, +\infty)$ د) $\max \rightarrow \sqrt[n]{n} \rightarrow \frac{-2}{-2} = 1 \rightarrow \sqrt[n]{n} = 9 \rightarrow (-\infty, 9] \cup [0, 3]$	9
الف) $\mathbb{R}$ ب) $\mathbb{R}$ ج) $\mathbb{R} \rightarrow [0, +\infty)$	10
الف) $\mathbb{R} = \{3\}$ ب) $\mathbb{R} = \{2\}$	