

$f(x) = \sqrt{(\sqrt{x-4}+2)^2}$ $g(x) = \sqrt{(\sqrt{x-4}-2)^2}$ $f(x) + g(x) = a + b\sqrt{x+c} \rightarrow \sqrt{x-4}+2 + \sqrt{x-4}-2 $ چنانچه $\rightarrow \sqrt{x-4}+2 + \sqrt{x-4}-2 \rightarrow 2\sqrt{x-4} = a + b\sqrt{x+c}$ $\frac{a+b}{c} \rightarrow \frac{2}{-4} = -\frac{1}{2} \rightarrow a=2, b=2, c=-4$	۱
$f(x) = \{(2, -4), (0, \frac{2}{5})\}$ $\frac{g}{f} = \{(2, -\frac{1}{4}), (0, 4)\}$	۲
الف) $f(x) \rightarrow \{(\frac{1}{4}, 2), (\frac{3}{4}, -1), (2, 2), (-\frac{1}{4}, 4)\}$ ب) $f(x^2) \rightarrow \{(1, 2), (\sqrt{3}, -1), (2, 2), (-1, 2), (-\sqrt{3}, -1), (-2, 2)\}$ ج) $g(f(x)+1) \rightarrow \{(-2, 9), (1, 9), (3, 9), (-1, 1)\}$ د) $\frac{f}{g} \rightarrow \{(1, -4), (3, -1)\}$	۳
$h = 2f + g \rightarrow 2f \rightarrow (2, 2), (3, 2), (4, 1), (2, 0)$ $1 \rightarrow \{(2, 5), (3, 5), (-2, 4)\}$	۴
I) $(\frac{f}{g+1})(x) \rightarrow$ $\frac{f}{g+1}$ $\xrightarrow{\text{مخرج برابر شود}}$ $\frac{f}{g+1}$ $\xrightarrow{\text{مخرج برابر شود}}$ $\frac{f}{g+1}$ II) $x_2 > 0 \rightarrow (x_2)$, $x \neq 2 \rightarrow$ $f(x)$ $g(x) = 0 \leftarrow \text{if } x \in \mathbb{R}$ $g(x) = -1 \leftarrow \text{if } x \notin \mathbb{R}$ III) $\sqrt{x} - x \geq 0 \rightarrow \sqrt{x} \geq x \rightarrow x \geq x^2$ $[0, 1] \quad x^2 - x \leq 0 \rightarrow x(x-1) \leq 0$	۵

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

$f(n) \rightarrow \{(1,0), (2,\sqrt{2}), (4,0)\}$ $h(n) = \frac{f(n)}{g(n)} = \{(1,0), (2,\frac{\sqrt{2}}{2}), (4,0)\}$	6
الف) $\mathbb{R}$ $(n-1)^3 + 1 \geq y$ $y-1 \geq (n-1)^3$ $n-1 = \sqrt[3]{y-1} \rightarrow n = 1 + \sqrt[3]{y-1}$ $R_f = \mathbb{R}$ ب) $y^2 - 2yn + 1 \rightarrow y^2 - 2yn - 1 \geq 0$ $n = \frac{2y \pm \sqrt{4y^2 + 4}}{2y} \rightarrow 4y^2 + 4 \geq 0$ $y^2 + 1 \geq 0$ $R_f = (-\infty, -1] \cup [0, +\infty)$	7
الف) $\min \rightarrow \sqrt[n]{y} \rightarrow \frac{f}{r} \geq r \rightarrow \sqrt[n]{y} = r \quad R_f = [4, +\infty)$ ب) $\max \rightarrow \sqrt[n]{y} \rightarrow \frac{-y}{-r} \geq r \rightarrow \sqrt[n]{y} = r \quad R_f = (-\infty, 12]$ ج) $\min \rightarrow \sqrt[n]{y} \rightarrow \frac{f}{r} \geq r \rightarrow \sqrt[n]{y} = -r \rightarrow [-7, +\infty) \xrightarrow{\sqrt{}} [0, +\infty)$ د) $\max \rightarrow \sqrt[n]{y} \rightarrow \frac{-y}{-r} \geq r \rightarrow \sqrt[n]{y} = r \rightarrow (-\infty, 9] \xrightarrow{\sqrt{}} [0, 3]$	8
الف) $\mathbb{R}$ ب) $\mathbb{R}$ ج) $\mathbb{R} \xrightarrow{\sqrt{}} [0, +\infty)$	9
الف) $\mathbb{R} - \{3\}$ ب) $\mathbb{R} - \{2\}$	10