

$x-4 = (\sqrt{x-4})^2 \rightarrow g(x) = \sqrt{x-4} = \sqrt{x-4} $ $f(x) = \sqrt{(\sqrt{x-4}+2)^2} = \sqrt{x-4}+2 \geq \sqrt{x-4}+2 \quad x \geq 1 \rightarrow \sqrt{x-4} \geq \sqrt{4}=2 \rightarrow \sqrt{x-4}-2 \geq 0$ $\rightarrow f(x) + g(x) = \sqrt{x-4}+2 + \sqrt{x-4}-2 = 2\sqrt{x-4} = \sqrt{4(x-4)} = \sqrt{4x-16} \rightarrow a+b\sqrt{x-4}$ $a=0 \quad b=1 \quad c=-16 \rightarrow \frac{a+b}{c} = -\frac{1}{16}$	1
$\frac{x+2}{(x-1)(x-5)} \quad g(x) = \{(2,1), (1,0), (2,0), (0,4)\}$ $f(2) = -1$ $f(1) = 0$ $f(2) = 0$ $f(0) = \frac{2}{5}$ $\frac{g}{f} = \{(2, -\frac{1}{5}), (0, 6)\}$	2
الف) $f(2x) = \{(\frac{1}{2}, 2), (\frac{2}{3}, 1), (2, 2), (-\frac{1}{2}, 2)\}$ $x = -\frac{1}{2}, 2, \frac{2}{3}, \frac{1}{2}$ ب) $f(x^2) = \{(1, 2), (-1, 2), (\sqrt{3}, 1), (-\sqrt{3}, 1), (2, 2), (-2, 2)\}$ ج) $2g^2(x) + 1 = \{(-2, 1), (1, 3), (2, 4), (-1, 1)\}$ د) $\frac{2f}{g} = \{(1, -4), (2, -1)\}$	3
$-2, 2, 2$ $x = -2 \rightarrow 2f(-2) + g(-2) = 2 \times 2 + 2 = 6$ $x = 2 \rightarrow (2, 1) + 2 = 0$ $x = 2 \rightarrow (2, 1) + 2 = 0$ $\{(-2, 2), (2, 2), (2, 0)\}$	4
$g(x) = [x] + [-x] \begin{cases} x \in \mathbb{Z} \\ x \in \mathbb{Z} - 1 \end{cases} \rightarrow \text{مخرج 0}$ $\left(\frac{f}{g+1}\right)(x) = f(x)$ $x \geq 0$ $x \neq 2$ $\sqrt{2x} - x \geq 0 \rightarrow \sqrt{2x} \geq x$ $x^2 - 2x \leq 0$ $D_f = \{0, 1, 2\}$ $\frac{0}{+1} \quad \frac{2}{-1} \quad \frac{2}{+}$	5

$$f(x) = \sqrt{ax - x^2 - 4}$$

$$h(x) = \frac{f(x)}{g(x)} = \left\{ (1, 0) \left(\sqrt{\frac{2}{3}} \right) (1, 0) \right\}$$

$$-(x^2 - 5x + 4) = -(x-1)(x-4) \geq 0$$

$$\frac{1}{-1+1-}$$

$$\text{الف) } g = x^2 - 2x + 2 \rightarrow g = (x-1)^2$$

$$\rightarrow \sqrt{g-1} = x-1 \rightarrow \sqrt{g_1} + 1 = x$$

$$R_f = \mathbb{R}$$

$$\text{ب) } x^2 - 2x = (x-1)^2 - 1$$

$$\rightarrow (x-1)^2 \geq 0 \rightarrow (x-1)^2 - 1 \geq -1$$

$$\rightarrow (x-1)^2 \geq -1 \rightarrow [-1, 0] \cup (0, \infty)$$

$$(-\infty, -1] \cup (0, \infty)$$

$$2. y = \sqrt{x-4x-3} \rightarrow y \rightarrow [0, +\infty)$$

$$\text{الف) } \sqrt{x-4x-3} \rightarrow x_2 = 3 \rightarrow y_2 = 9 \rightarrow \sqrt{9-3} = \sqrt{6} \rightarrow [0, \sqrt{6}]$$

$$\text{ب) } y = x^2 - 4x + 10 \rightarrow x_2 = 2 \rightarrow y_2 = 4 - 8 + 10 = 6 \rightarrow [4, +\infty)$$

$$\text{ج) } y = -x^2 + 4x + 3 \rightarrow x_2 = \frac{-4}{-2} = 2 \rightarrow y_2 = -4 + 11 + 3 = 10 \rightarrow (-\infty, 12]$$

$$\text{الف) } y = x^2 - 4x + 10 \rightarrow R$$

$$\text{ب) } y = -x^2 + 4x + 3 \rightarrow R$$

$$\text{ج) } y = x^2 - 4x + 10 \rightarrow [0, +\infty)$$

$$\text{د) } y = x^2 - 4x + 10 \rightarrow [0, +\infty)$$

$$a=3, c=1 \rightarrow 3 \leq y \leq 10 \rightarrow R = [3, 10] \leftarrow \frac{a}{c} \leq y = \frac{ax+b}{cx+d} \leftarrow$$

$$\text{ب) } R = \{2\} \leftarrow 2 \leq y \leq 10 \rightarrow a=2, c=1$$