

$$\left. \begin{aligned} f(x) &= \sqrt{x+c} \sqrt{x-c} \\ g(x) &= \sqrt{x-c} \sqrt{x+c} \end{aligned} \right\} \begin{aligned} t &= \sqrt{x-c} \Rightarrow x = t^2 + c \\ f(x) &= \sqrt{t^2 + ct + c} \rightarrow \sqrt{(t+c)^2} = t+c \end{aligned} \quad (1)$$

$$\begin{aligned} g(x) &= \sqrt{t^2 - ct + c} = \sqrt{(t-c)^2} = t-c \\ f(x) + g(x) &= t + \sqrt{x-c} = a + b\sqrt{x+c} \Rightarrow \begin{cases} a = 9 \\ b = 2 \\ c = -c \end{cases} \\ \frac{a+b}{c} &= \frac{-1}{2} \end{aligned}$$

$$\left. \begin{aligned} f(x) &= \frac{x+2}{(x-1)(x-3)} \Rightarrow D_f = \mathbb{R} - \{1, 3\} \\ D_g &= \{1, 1, 3, 3\} \Rightarrow D_g \cap D_f = \{0, 2\} \end{aligned} \right\} \frac{g}{f} = \left\{ (0, 2), (2, -\frac{1}{2}) \right\} \quad (2)$$

$$\text{الف) } f(x) = \left\{ \left(\frac{1}{2}, 2\right), \left(\frac{3}{2}, -1\right), (1, 2), \left(-\frac{1}{2}, 9\right) \right\} \quad (3)$$

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

$$\text{ج) } 2g^2(x) = \left\{ (-2, 19), (1, 3), (3, 9), (-1, 1) \right\}$$

$$\text{د) } \frac{f}{g} = \left\{ (1, -c), (3, -1) \right\}$$

④

$$h = \{f, g\}$$

$$h = \{(1, \omega), (3, \omega), (-1, \omega)\}$$

⑤

$$Df = [0, 2) \cup (2, 3]$$

$$1) x \geq 0, 2) \sqrt{3-x} - x \geq 0 \Rightarrow x(3-x) \geq 0 \Rightarrow \frac{0}{1+1} = 0 \Rightarrow [0, 3]$$

$$3) x \neq 2$$

$$g(x) = [x] + [-x] \rightarrow \begin{cases} x \in \mathbb{Z} \Rightarrow g(x) + 1 = 1 \\ x \in (R - \mathbb{Z}) \Rightarrow g(x) + 1 = 0 \end{cases}$$

$$Dg = \overline{\mathbb{Z}} \text{ مع كل } x \in \mathbb{R} \Rightarrow \text{ليس } 0 \neq \text{مجموع}$$

$$Df \cap Dg = [0, 1, 3]$$

$$f(x) = \sqrt{-(x-1)(x-4)} \rightarrow Df = [1, 4] \quad \left\{ \begin{array}{l} Dg \cap Df = \{1, 2, 4\} \\ Dg = [1, 2, 4, \omega] \end{array} \right.$$

⑥

$$h = \{(1, \omega), (2, \frac{\sqrt{2}}{2}), (4, \omega)\}$$

⑦

$$\text{و) } y = x^3 - 3x^2 + 3x \rightarrow -1 + 1$$

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

$$Rf = \mathbb{R} \leftarrow$$

$$\text{ب) } yx^2 - 2xy - 1 = 0 \leadsto x = \frac{+1 \pm \sqrt{4y^2 + 4y}}{2y}$$

$$1) y \neq 0$$

$$2) 4y^2 + 4y \geq 0 \leadsto 4y(y+1) \geq 0 \quad \begin{matrix} -1 & 0 \\ + & - & + \end{matrix} \quad R_f = (-\infty, -1] \cup (0, +\infty)$$

$$\text{ا) } y = x^2 - 6x + 6 \quad \min x = \begin{bmatrix} 3 \\ 9 \end{bmatrix} \Rightarrow R_f = [9, +\infty) \quad \textcircled{1}$$

$$b = \frac{-b}{2a} = 3$$

$$\text{ب) } y = -x^2 + 4x + 3 \quad \max x = \begin{bmatrix} 2 \\ 11 \end{bmatrix} \Rightarrow R_f = (-\infty, 11]$$

$$b = \frac{-b}{2a} = 2$$

$$\text{ج) } y = \sqrt{x^2 - 6x + 5} \quad \min x = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$$

$$b = \frac{-b}{2a} = 3 \quad \begin{matrix} \text{زیر اسی} \\ \text{نقطه} \end{matrix} \quad [-1, +\infty) \Rightarrow R_f = [0, +\infty)$$

$$\text{د) } y = \sqrt{4x - x^2} \quad \max x = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$$

$$b = \frac{-b}{2a} = 2 \quad \begin{matrix} \text{زیر اسی} \\ \text{نقطه} \end{matrix} \quad (-\infty, 4] \Rightarrow R_f = [0, 2]$$

$$\text{ا) } \rightarrow \text{بزرگترین و کوچکترین مقادیر تابع} \quad R_f = \mathbb{R} \quad \textcircled{2}$$

$$b = \frac{-b}{2a} = 2$$

$$\text{ب) } R_f = \mathbb{R}$$

$$\text{ج) } \rightarrow \mathbb{R} \xrightarrow{\text{زیر اسی}} R_f = [0, +\infty)$$

$$> \mathbb{R} \xrightarrow{\text{بسته}} [r, +\infty) = R_f$$

کشف مانتا

$$\text{الف) } g = \frac{r_{n+1}}{n-2} \rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \xrightarrow{\frac{ax+b}{cx+d}} \left(\frac{a}{c} \right) \leftarrow \text{نقطه حذف}$$

$$R_f = \mathbb{R} - \{r\} \leq (-\infty, r) \cup (r, +\infty)$$

$$\text{ب) } g = \frac{r_{n+1}}{n+1} \rightarrow \text{نقطه حذف} \Rightarrow R_f = \mathbb{R} - \{r\}$$