

$$x + t \sqrt{x-t} = t^2 + t + t \sqrt{x-t} = (t+t)^2$$

$$f(x) = |t+t| = \sqrt{(x-t)+t}$$

$$x - t \sqrt{x-t} = t^2 + t - t \sqrt{x-t} = (t-t)^2$$

$$g(x) = |t-t| = \sqrt{x-t}$$

$$g(x) = \sqrt{x-t} - t$$

$$f(x) + g(x) = (\sqrt{x-t} + t) + (\sqrt{x-t} - t) = 2\sqrt{x-t}$$

$$\begin{aligned} a &= 0 & \frac{0+t}{-t} &= -\frac{1}{t} \\ b &= t & & \\ c &= -t & & \end{aligned}$$

$$x^2 - tx + t^2 = (x-1)(x-t) = 0 \quad x \neq 1, t$$

$$f(t) = \frac{t+t}{-t} = -t \quad f(0) = \frac{t}{t} = 1 \quad g(0) = t$$

$$g(t) = 1$$

$$\left(\frac{g}{f}\right)(t) = \frac{1}{-t} = -\frac{1}{t} \quad \left(\frac{g}{f}\right)(0) = \frac{t}{t} = 1$$

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

$$\text{ا) } x=1 \quad x=\frac{1}{t} \Rightarrow f=t \quad x=t \quad x=\frac{t}{t} \Rightarrow f=1$$

$$x=t \Rightarrow f=t \quad x=-1 \quad x=-\frac{1}{t} \Rightarrow f=t$$

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

$$\text{ب) } x^2=1 \quad x=\pm 1 \quad x^2=t \quad x=\pm t$$

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

$$2.) \quad x=-t \quad x(3)^2+1=19 \quad x=1 \quad x(1)^2+1=2$$

$$x=t \quad x(2)^2+1=9 \quad x=-1 \quad x(0)^2+1=1$$

$$x \cdot g^2(x) + 1 = \left\{ (-2, 19), (1, 2), (2, 9), (-1, 1) \right\}$$

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

$$\frac{f(r)}{-1} = -r$$

$$\frac{f(-1)}{r} = -1$$

$$\frac{f}{g} = \{(-1, 1r)(1, -r)(r, -1)\}$$

$$x = r \Rightarrow h(r) = f(1) + r = \omega$$

$$x = r \Rightarrow h(r) = f(1) + r = \omega$$

$$h(-r) = f(0) + r = r$$

$$h = \{(r, \omega)(r, \omega)(-r, r)\}$$

$$r \geq 0 \quad x \geq 0 \quad \sqrt{r^2 - x} \geq 0 \quad \sqrt{r^2 - x} \geq x \quad (1)$$

$$0 \leq x \leq r \Rightarrow x \neq r$$

$$r \geq x^2$$

$$g(x) = [x] + [-x] \Rightarrow g(x) = r$$

$$g(x) = -1 \neq g(x) + 1 \neq 0 \quad D = \{0, 1, r\}$$

$$h(x) = \frac{f(x)}{g(x)} \quad f(1) = 1 \quad h(1) = 0 \quad f(r) = r \quad (2)$$

$$f(r) = r \quad h(r) = \frac{\sqrt{r}}{r} \quad h(r) = 0$$

$$h = \{(1, 0)(r, \frac{\sqrt{r}}{r})(r, 0)\}$$

الف) $y = (x-1)^3 + 1$ $(x-1)^3 \in \mathbb{R}$ $R_f = \mathbb{R}$ (1)

ب) $x^2 - 2x = (x-1)^2 - 1$ $[-1 + \infty)$ من مقدار خارج

$x^2 - 2x \in [-1 + \infty) \cup (0 + \infty)$ $R_y = (-\infty - 1] \cup (0 + \infty)$

الف) $y = (x-2)^2 + 4$ $R_y = [4 + \infty)$ حداقل مقدار (1)

ب) $y = -(x-3)^2 + 12$ $R_y = (-\infty 12]$ حداکثر مقدار

ج) $x^2 - 4x - 4 = (x-2)^2 - 8$ $R_y = [-8 + \infty)$

د) $y = \sqrt{4x - x^2}$ $4x - x^2 = 4 - (x-2)^2$

$0 \leq 4x - x^2 \leq 4$

$0 \leq y \leq 2$ $R_y = [0 2]$

الف) $R_y = \mathbb{R}$ درجه ۳ (1)

ب) $R_y = \mathbb{R}$ بالاترین توان فرست

ج) $R_y = [0 + \infty)$ رادیکال با درجه فرد

د) $R_y = [0 + \infty)$ به نهایت است ده رادیکال مثبت حقیقی را می برد

$y > 0$ تابع حقیقی کامل است

الف) $R_y = \mathbb{R} - \{ \frac{4}{x} \} \Rightarrow \mathbb{R} - \{ 2 \}$ (1)

ب) $R_y = \mathbb{R} - \{ \frac{4}{x} \} \Rightarrow \mathbb{R} - \{ 2 \}$