

$$f(x) \rightarrow x > 1, (x+1)(x+1) \Rightarrow f(x) = (x+1)(x) = x^2 + x \quad -1$$

$$f(-x) \rightarrow x \leq 1, x^2 + x \Rightarrow f(-x) = x^2 + x(-x) = x^2 - x$$

$$f(x^2 + x) = x^2 - x + x \Rightarrow 1 \cdot x^2 + 1 \cdot x = x^2 - x \Rightarrow 1 \cdot x = -x$$

$$\Rightarrow x = -1, 1$$

$$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 1 \xrightarrow{f(x+\sqrt{x})} \sqrt{x+\sqrt{x}} + \frac{1}{\sqrt{x+\sqrt{x}}} + 1 \quad -2$$

$$\begin{aligned} &= \sqrt{x+\sqrt{x}} + \frac{1}{\sqrt{x+\sqrt{x}}} + 1 \\ &= \sqrt{x+\sqrt{x}} + \frac{1}{\sqrt{x+\sqrt{x}}} + 1 = \sqrt{x} + \sqrt{x} + 1 = \sqrt{x} + \sqrt{x} + 1 \end{aligned}$$

$$(\sqrt{x+\sqrt{x}} + \sqrt{x+\sqrt{x}})^2 = x + \sqrt{x} + \sqrt{x} + \sqrt{x} + \sqrt{x} + 1 = 4\sqrt{x} + 1 \Rightarrow \sqrt{x} = \sqrt{4\sqrt{x} + 1} \quad -3$$

$$x \rightarrow (x^2 f(x) - x^2 f(-x)) = (x^2 - x) \cdot x \Rightarrow x^2 f(x) - x^2 f(-x) = 1 \cdot x^2 - x^2$$

$$-x \rightarrow (x^2 f(-x) - x^2 f(x)) = (x^2 + x) \cdot x \Rightarrow x^2 f(-x) - x^2 f(x) = 1 \cdot x^2 + x^2$$

$$\Rightarrow f(x) = -x^2 - \frac{x}{x}$$

$$0 \rightarrow x^2 f(0) - 0 = 0 + x^2 m - 1 \Rightarrow f(0) = \frac{x^2 m - 1}{x^2} \quad -4$$

$$-2 \rightarrow 0 + x^2 f(0) = 1 \cdot x + x^2 m + x^2 m - 1 \Rightarrow f(0) = \frac{1 \cdot x}{x^2} + \frac{x^2 m}{x^2}$$

$$\frac{x^2 m - 1}{x^2} = \frac{1 \cdot x + x^2 m}{x^2} \Rightarrow x^2 m - 1 = 1 \cdot x + x^2 m \Rightarrow x^2 m = 1 \cdot x \Rightarrow m = \frac{1}{x}$$

$$f(0) = \frac{x^2 m}{x^2} - \frac{1}{x^2} = \frac{x^2 \cdot \frac{1}{x}}{x^2} - \frac{1}{x^2} = \frac{1 \cdot x}{x^2} - \frac{1}{x^2}$$

$$ax + b + \frac{a}{x} + b = \frac{x^2 m - 1 \cdot x + x^2}{x} \xrightarrow{x(x)} ax^2 + bx + a + bx = x^2 m - 1 \cdot x + x^2$$

$$a = x, b = -1$$

$$(x^2 m - 1 \cdot x + x^2) = (x^2 m - 1 \cdot x + x^2)$$

$$f(x) = x^2 m - 1 \Rightarrow -1 - 1 = -2$$

$\begin{cases} f(x) = (x-1)\sqrt{1-x} \rightarrow x \leq 1 \rightarrow x=0 \Rightarrow \textcircled{-1} \\ g(x) = -\sqrt{(1-x)^3} \end{cases}$
 $D_f = D_g \Rightarrow$ برابر هستند.

$\begin{cases} f(x) = x\sqrt{x} \rightarrow x \geq 0, D_f = [0, +\infty) \\ g(x) = \sqrt{x^3} \Rightarrow x^3 \geq 0 \Rightarrow x \geq 0, D_g = [0, +\infty) \end{cases}$
 $x=2 \Rightarrow f(x)=2\sqrt{2}, g(x)=\sqrt{8}=2\sqrt{2}$
 برابرند.

$\begin{cases} f(x) = [\sqrt{x}] - [\sqrt{x}] \\ g(x) = \sqrt{x - |x|} \end{cases} D_f = [0, +\infty)$
 $[\sqrt{x}] - [\sqrt{x}] = 0$
 $D_g = [0, +\infty)$
 در همه جا برابر و هر دو همواره منفی
 برابرند.

الف) $\left(\frac{f+g}{f-g}\right)(1) = \left\lfloor \frac{f(1)+g(1)}{f(1)-g(1)} \right\rfloor = \left\lfloor \frac{1+1}{1-1} \right\rfloor = \left\lfloor \frac{2}{0} \right\rfloor = \left\lfloor \infty \right\rfloor = \infty$
 ب) $\left(\frac{f+g}{f-g}\right)(1) = \text{تعریف نشده}$
 ج) $f(0)g(-1) = 0 \times 1 = 0$
 $f+g = \{(0,2), (1,3), (2,4), (3,4)\}$
 $f-g = \{(0,-2), (1,1), (2,0), (3,-4)\}$
 $\left(\frac{f+g}{f-g}\right) = \{(0, \frac{2}{-2}), (1, \frac{3}{1}), (2, \frac{4}{0}), (3, \frac{4}{-4})\}$
 $= \{(0, -1), (1, 3), (2, \text{تعریف نشده}), (3, -1)\}$

الف) $f(x) = \{(2,1), (-1,4), (2,5), (-2,2), (3,-1)\}$
 $\sqrt{x-1} = 1 \Rightarrow x=2, \sqrt{x-1} = -1 \Rightarrow x=0, \sqrt{x-1} = 0 \Rightarrow x=1, \sqrt{x-1} = -2 \Rightarrow x=-1, \sqrt{x-1} = \frac{1}{3} \Rightarrow x=\frac{10}{9}$
 $\sqrt{x-1} = 3 \Rightarrow x=10$
 $g(x) = f(\sqrt{x-1})$
 $g(x) = \{(1,1), (0,4), (\frac{10}{9}, 5), (-\frac{1}{3}, 2), (\frac{9}{4}, -1)\}$

ب) $h(x) = f(|x|)$
 $|x|=2 \Rightarrow x=\pm 2, |x|=-1 \rightarrow \emptyset, |x|=0 \Rightarrow x=0, |x|=-2 \rightarrow \emptyset, |x|=3 \Rightarrow x=\pm 3$
 $h(x) = \{(-2,1), (2,1), (0,5), (-3,-1), (3,-1)\}$