

$$f(x) = \begin{cases} (a+1)(x+2) & : x > 1 \\ 3a+2x & : x \leq 1 \end{cases} \quad \begin{aligned} f(1) &= f(-1) + a \\ f(a+1)(1) &= 3a - 1 + a \end{aligned}$$

$$14a + 12 = 4a - 1$$

$$a = 1 \cdot \frac{-13}{10} = -\frac{13}{10}$$

$$10a = -13$$

$$a = -1,3$$

$$\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2 \rightarrow \sqrt{x - \sqrt{x} + 1 + \sqrt{x}} + 2 = \sqrt{4} \quad (I)$$

$$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 2 \quad f(\sqrt{x}) + f\left(\frac{1}{\sqrt{x}}\right) = 4$$

$$\rightarrow \sqrt{\sqrt{x} - \sqrt{x} + 1 + \sqrt{x}} + 2 \rightarrow \sqrt{4} + 2 = \sqrt{4 + 4}$$

$$(x - \sqrt{x}) / (x + \sqrt{x}) = 2 - 3 = 1$$

$$\frac{1}{\sqrt{x} - \sqrt{x}} = \sqrt{x + \sqrt{x}} \quad (\sqrt{x - \sqrt{x}} + \sqrt{x + \sqrt{x}})^2 = 4 + 2 \cdot \frac{1}{\sqrt{x} - \sqrt{x}} \cdot (\sqrt{x} - \sqrt{x}) \rightarrow 4$$

$$(I) \quad \sqrt{x - \sqrt{x}} + \sqrt{x + \sqrt{x}} = \sqrt{4} \rightarrow$$

$$f(x) - f(-x) = 2x^2 - 2 \quad 2 \times f(x) - 2f(-x) = 4x^2 - 4 \rightarrow f(x) - f(-x) = x^2 - 1$$

$$f(x) = 1 \quad 2 \times f(-x) - 2f(x) = -4x^2 + 4 \rightarrow f(-x) - f(x) = -x^2 + 1$$

$$\rightarrow -\Delta f(x) = 20x^2 - 2$$

$$f(x) = \frac{20x^2 + 2}{-2} \rightarrow \sqrt{-10x^2 - 1} = f(x)$$

$$(x+2)f(x) - 3mf(x+2) = 4x^2 - mx + 3m - 1$$

$$f(0) = 1 \rightarrow \frac{20}{2} - 1 = \frac{20}{2} \times \frac{1}{2} = \frac{20}{2} = f(0)$$

$$2f(0) = 3m - 1 \rightarrow 2 \times 1 = 3m - 1 \rightarrow 4f(0) = 9m - 3 = 15 + 5m$$

$$x = -2 \rightarrow +9f(0) = 14 + 2m + 3m - 1 \quad 4m = 13$$

$$4f(0) = 15 + 5m$$

$$m = \frac{13}{5} = \frac{2,6}{1}$$

$$f(x) + f\left(\frac{1}{x}\right) = \frac{20x^2 - 12x + 2}{x}$$

$$f(-1) = 1 \quad f(-1) + f(-1) = \frac{20 + 12 + 2}{-1}$$

$$2f(-1) = -34 \rightarrow f(-1) = -17$$

تساوی تابع ؟ $\begin{cases} f(x) = (x-1)\sqrt{1-x} & 1-x \geq 0 \\ g(x) = -\sqrt{(x+1)^3} & x \leq 1 \end{cases}$ $(-x+1)^3 \geq 0$ برابری $f(x) = g(x)$ $\mathbb{R}^+ \checkmark$ $\circ \checkmark$ $\circ \leq x \leq 1 \checkmark$	۶
تساوی تابع ؟ برابری $\begin{cases} f(x) = x\sqrt{x} & x \geq 0 \\ g(x) = \sqrt{x^3} & x \geq 0 \end{cases}$ $\mathbb{R}^+ \checkmark$ $\mathbb{R}^+ \checkmark$ $\mathbb{R}^+ \checkmark$ $f(x) = g(x)$	۷
تساوی تابع ؟ $\begin{cases} f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] & x \geq 0 \\ g(x) = \sqrt{x - x } & x \geq 0 \end{cases}$ عدد صحیح $\Rightarrow \sqrt{x} - \lfloor \sqrt{x} \rfloor < 1$ $f(x) = 0$ منفی عدد $\rightarrow$ $f(x) = g(x)$ برابری $\mathbb{R}^+ \checkmark$ در دامنه مثبت	۸
$g = \{(-1, 0), (1, 0), (2, 3), (3, 5), (0, 2), (1, \sqrt{5})\}$ $f = \{(1, 2), (2, 3), (3, 5), (0, 0)\}$ الف) $\left(\frac{f+g}{f-g}\right)(1) = \frac{3}{1} = 3$ ب) $\left(\frac{f \cdot g}{f-g}\right)(2) = \frac{6}{0}$ (تعریف نشده) ج) $f(0) \cdot g(-1) = 0 \times 1 = 0$	۹
$f(x) = \{(2, 1), (-1, 2), (0, 5), (-2, 2), (3, -1)\}$ $3x = -1 \Rightarrow x = -\frac{1}{3}$ الف) $g(x) = f(3x-1)$ $3x = 3 \Rightarrow x = 1$ $3x = 0 \Rightarrow x = 0$ $3x = 1 \Rightarrow x = \frac{1}{3}$ $3x = 2 \Rightarrow x = \frac{2}{3}$ $3x-1 = 0 \Rightarrow 3x = 1 \Rightarrow x = \frac{1}{3}$ $3x-1 = 2 \Rightarrow 3x = 3 \Rightarrow x = 1$ $3x-1 = -1 \Rightarrow 3x = 0 \Rightarrow x = 0$ $3x-1 = 3 \Rightarrow 3x = 4 \Rightarrow x = \frac{4}{3}$ $g(x) = \{(1, 1), (0, 2), (\frac{1}{3}, 5), (-\frac{1}{3}, 2), (\frac{4}{3}, -1)\}$ ب) $h(x) = f(x)$ $x = 2 \Rightarrow x = \pm 2$ $x = -1 \Rightarrow x = 0$ $x = 3 \Rightarrow x = \pm 3$ $h(x) = \{(-3, -1), (-2, 1), (0, 5), (2, 1), (3, -1)\}$	۱۰