

$$f(a) = f(-2) + a$$

$$f(a) = (a+1)(a+2) = 7(a+1) = 7a+7 \quad \text{چون } a > 1$$

$$7a+7 = (3a-4) + a$$

$$f(-2) = 3a+2(-2) = 3a-4 \quad \text{چون } a \leq 1$$

$$7a+7 = 4a-4$$

$$3a = -11 \Rightarrow a = -\frac{11}{3}$$

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

$$\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} = \sqrt{4}$$

$$f(2-\sqrt{3}) + f(2+\sqrt{3}) = 2\sqrt{4} + f \quad f + 2\sqrt{4}$$

$$2f(-x) - 3f(x) = 5x^2 + x$$

$$2f(x) - 3f(-x) = 5x^2 - x$$

$$4f(x) - 4f(x) = 10x^2 - 2x$$

$$3f(x) + 2f(-x) = 5x^2 + x$$

$$-2f(x) = 10x^2 + x$$

$$-9f(x) + 4f(-x) = 12x^2 + 3x$$

$$f(x) = -\frac{5}{9}x^2 - \frac{x}{3}$$

$$(x+2)f(x) - 3xf(x+2) = 5x^2 - mx + 3m - 1$$

$$2f(0) = 3m - 1$$

$$4f(0) = 12 + 2m$$

$$9m - 3 = 12 + 2m \Rightarrow m = \frac{9}{7}$$

$$f(0) = \frac{2(\frac{9}{7}) - 1}{2} = \frac{10}{7}$$

$$f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b = ax + \frac{a}{x} + 2b$$

$$f(x) = 3x - 4$$

$$\frac{3x^2 - 12x + 3}{x} = 3x - 12 + \frac{3}{x}$$

$$a = 3$$

$$2b = -12 \rightarrow b = -6$$

$$f(-1) = 3(-1) - 4 = -3 - 4 = -7$$

$f(x) = (x-1)\sqrt{1-x}$ $g(x) = -\sqrt{(1-x)^3} = -(1-x)\sqrt{1-x} = f(x) = g(x)$ $x \leq 1$	6
$\sqrt{x^2} = \sqrt{x^2 \cdot 1} = x \sqrt{1}$ $g(x) = x\sqrt{x} = f(x)$ $f(x) = g(x)$, $x \geq 0$ $D_f = [0, +\infty) \leftarrow$ مشخص	7
$g(x) = \sqrt{x-x} = 0$ اگر $0 \leq x = x$, $x \geq 0$ $f(x) = \sqrt{x} - [\sqrt{x}] = \sqrt{x} - 1 \neq 0$ $f \neq g$ تابع نیست.	8
الف) $\left(\frac{f+g}{f-g}\right)(1)$ $f(1) = 2$, $g(1) = 1$ $\frac{2+1}{2-1} = 3$ ب) $\left(\frac{f+g}{f-g}\right)(2)$ $f(2) = 3$, $g(2) = 3$ $\frac{3+3}{3-3} = \frac{4}{0}$ تعریف نشده ج) $f(1)g(-1)$ $f(1) = 2$, $g(-1) = 1$ $2 \times 1 = 2$	9
الف) $3x-1 \in \{-2, -1, 1, 2, 3\}$ $x \in \{-\frac{1}{3}, 0, \frac{2}{3}, 1, \frac{4}{3}\}$ $g = \{(-\frac{1}{3}, 2), (0, 4), (\frac{2}{3}, 5), (1, 1), (\frac{4}{3}, -1)\}$ ب) $h(1) = h(-1) = 5$ $h(2) = h(-2) = 1$ $h(3) = h(-3) = -1$ $h = \{(-3, -1), (-2, 1), (-1, 5), (1, 5), (2, 1), (3, -1)\}$	10