

$$f(x) + f\left(\frac{1}{x}\right) = \frac{3x^3 - 12x + 10}{x}$$

$$f(-1) = 0$$

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

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

5

$$ax + b + \frac{a}{x} + b = \frac{3x^3 - 12x + 10}{x}$$

$$\frac{ax^2}{x} + \frac{a}{x} + bx = \frac{3x^3}{x} - \frac{12x}{x} + \frac{10}{x}$$

$$ax^2 = 3x^2 \Rightarrow a = 3$$

$$bx = -12x \Rightarrow b = -12$$

6

$$f(x) = (x-1)\sqrt{1-x} \quad 1-x \geq 0 \rightarrow x \leq 1 \quad D_f = (-\infty, 1]$$

$$D_f = D_g$$

$$g(x) = -\sqrt{(1-x)^3} \Rightarrow -\sqrt{(1-x)^2} \sqrt{1-x} \Rightarrow 1-x \geq 0 \rightarrow x \leq 1 \rightarrow D_g = (-\infty, 1]$$

$$f(x) = x\sqrt{x} \quad x \geq 0 \Rightarrow D_f = [0, +\infty)$$

$$D_f = D_g$$

$$g(x) = \sqrt{x^3} \quad x^3 \geq 0 \Rightarrow D_g = [0, +\infty)$$

$$f(x) = f(g)$$

7

$$f(x) = \left[\sqrt{x} - \left[\sqrt{x} \right] \right]$$

$$x \geq 0 \quad D_f = [0, +\infty)$$

8

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

$$0 \leq \sqrt{x} - \left[\sqrt{x} \right] \leq 1 \Rightarrow f(x) = 0$$

$$f = g$$

$$x - |x| \geq 0 \Rightarrow x \geq 0 \rightarrow |x| = x \rightarrow x - |x| = 0 \Rightarrow g(x) = 0 \quad D_g = [0, +\infty)$$

$$x < 0 \rightarrow |x| < 0 \rightarrow g(x) = \sqrt{-x}$$

9

$$\text{الف, } \left(\frac{f+g}{f-g} \right)(1) \Rightarrow \frac{f(1)+g(1)}{f(1)-g(1)} = \frac{1+1}{1-1} = \text{undefined}$$

$$\text{ب, } \left(\frac{f+g}{f-g} \right)(r) \Rightarrow \frac{f(r)+g(r)}{f(r)-g(r)} = \frac{r+r}{r-r} = \text{undefined}$$

$$f(x) = \begin{cases} (a+1)(x+r) & : x > 1 \\ rx + r_a & : x \leq 1 \end{cases}$$

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

$$(a+1) \times r + r_a = r_a - r$$

$$1 \times a + 1 \times r = r_a - r$$

$$1 \times a = -1 \times r \rightarrow a = -1 \times r$$

2

$$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + r$$

$$r(y+z+r) = r(y+z)+r \Rightarrow f(r-\sqrt{r}) = \frac{1}{\sqrt{r-\sqrt{r}}} + \sqrt{r-\sqrt{r}} + r$$

$$f(r-\sqrt{r}) + f(r+\sqrt{r}) = ?$$

$$f(r+\sqrt{r}) = \frac{1}{\sqrt{r+\sqrt{r}}} + \sqrt{r+\sqrt{r}} + r$$

$$y = \sqrt{r-\sqrt{r}} \quad z = \sqrt{r+\sqrt{r}}$$

$$yz = \sqrt{r-\sqrt{r}} \times \sqrt{r+\sqrt{r}} = 1$$

$$\Rightarrow \frac{1}{y} = z \quad / \quad \frac{1}{z} = y$$

$$\rightarrow y+z+r$$

نه چون با هم در صند خراب ميشود

$$r(y+z)+r = r\sqrt{4}+r$$

$$(y+z)^2 = y^2 + z^2 + 2yz \Rightarrow r + \sqrt{r} + r - \sqrt{r} + r\sqrt{1} = 4 \Rightarrow y+z = \sqrt{4}$$

$$rf(x) - rf(-x) = rx^2 - x$$

$$rf(x) - rf(-x) = rx^2 - rx$$

$$x = -x$$

$$\rightarrow rf(-x) - rf(x) = rx^2 + x$$

$$rf(-x) - rf(x) = rx^2 + rx$$

$$-2rf(x) = rx^2 + x$$

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

$$f(0) = ? \quad \frac{r_0}{r} \quad \text{جواب}$$

$$(x+r)f(x) - rf(x+r) = rx^2 - mx + r^{m-1}$$

$$\frac{r^{m-1}}{r} = \frac{10 + \omega m}{r}$$

$$x=0 \quad (r)f(0) - 0 = r^{m-1}$$

$$9m - 10 = 10 + \omega m$$

$$rf(0) = r^{m-1} \Rightarrow f(0) = \frac{r^{m-1}}{r} \Rightarrow \frac{r^4}{r} = \frac{r_0}{r} \Rightarrow m = \frac{4}{r}$$

$$x = -r \Rightarrow (0)f(r) + rf(0) = 14 + r^m + r^{m-1}$$

$$rf(0) = 10 + \omega m$$

ج) $f(x) = x - 1$

40

$f(x) = \{ (1, 1), (-1, 4), (0, 5), (-2, 2), (2, -1) \}$

الف) $g(x) = f(x - 1)$

$x - 1 = -2 \rightarrow x = -\frac{1}{2} \rightarrow f(-\frac{1}{2}) = 2$
 $x - 1 = 0 \rightarrow x = 1 \rightarrow f(1) = 5$
 $x - 1 = -1 \rightarrow x = 0 \rightarrow f(0) = 4$
 $x - 1 = 2 \rightarrow x = 3 \rightarrow f(3) = 1$
 $x - 1 = -2 \rightarrow x = -1 \rightarrow f(-1) = 4$
 $x - 1 = 1 \rightarrow x = 2 \rightarrow f(2) = -1$
 $x - 1 = \frac{1}{2} \rightarrow x = \frac{3}{2} \rightarrow f(\frac{3}{2}) = 1$

$g(x) = \{ (-\frac{1}{2}, 2), (1, 5), (0, 4), (3, 1), (-1, 4), (\frac{3}{2}, -1) \}$

ب) $h(x) = f(|x|)$

$|x| = 0 \rightarrow h(0) = f(0) = 5$
 $|x| = 1 \rightarrow h(1) = f(1) = 5$
 $|x| = 2 \rightarrow h(2) = f(2) = -1$
 $|x| = 3 \rightarrow h(3) = f(3) = 1$

$h(x) = \{ (0, 5), (1, 5), (2, -1), (3, 1), (-1, 5), (-2, -1), (-3, 1) \}$

$h(x) = f(|x|)$

النتيجة