

۲. آفرین ممای نوشت

فرصت های ناه / تلفت شماره ۴ / ۱۳۸۸

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

①

$$x=a \rightarrow f(a) = \sqrt{a} + \sqrt{a} \quad \left\{ \begin{array}{l} 2(\sqrt{a} + \sqrt{a}) = 2a - c + a \\ 4\sqrt{a} + 2c = 3a - c \end{array} \right.$$

$$x=-2 \rightarrow f(-2) = 2a - c \quad \left\{ \begin{array}{l} 4\sqrt{a} + 2c = 3a - c \\ 4\sqrt{a} + 3c = 3a \end{array} \right. \rightarrow a = -1, 1 \rightarrow \text{✓}$$

②

③

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

$$x = 2 + \sqrt{3} \rightarrow \frac{1}{x} = \frac{(2-\sqrt{3})}{(2+\sqrt{3})(2-\sqrt{3})} \rightarrow x + \frac{1}{x} = 2 + \sqrt{3} + \frac{1}{2+\sqrt{3}} \rightarrow \text{✓}$$

④

$$(\sqrt{x} + \frac{1}{\sqrt{x}})^2 = x + \frac{1}{x} + 2 \sim (\sqrt{x} + \frac{1}{\sqrt{x}})^2 = 4$$

$$\sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{4} \Rightarrow f(2+\sqrt{3}) = \sqrt{4} + 2$$

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

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

$$(2f(x) - 2f(-x) = (2x^2 - x)^2 \Rightarrow 4f(x) - 4f(-x) = 4x^2 - 2x \quad \text{⑤}$$

+

$$x=-x \Rightarrow (2f(-x) - 2f(x) = (2x^2 + x)^2 \Rightarrow 4f(-x) - 4f(x) = 4x^2 + 2x$$

$$-4f(x) = 4x^2 + 2x \quad \text{⑥}$$

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

sa.m

$$(n+r)f(n) - rf(n+r) = cn^r - mn + r^2m - 1$$

(3)

$$\hookrightarrow n=0 \Rightarrow rf(0) = r^2m - 1$$

$$n=-r \Rightarrow rf(0) = 1a + am \Rightarrow r(r^2m - 1) = 1a + am$$

$$r^3m - r = 1a + am$$

$$cm = 1a, m = \frac{a}{r}$$

$$rf(0) = r\left(\frac{a}{r}\right) - 1 = \frac{ra}{r} \Rightarrow f(0) = \frac{ra}{r}$$

(4)

$$f(n) + f\left(\frac{1}{n}\right) = \frac{r^2n^r - rn + r}{n}$$

(5)

$$\hookrightarrow an + b + \frac{a}{n} + b =$$

$$a\left(n + \frac{1}{n}\right) + rb = r^2n + \frac{r}{n} - 1r \rightarrow a = r$$

$$\hookrightarrow r\left(n + \frac{1}{n}\right) + r(-a) \quad b = -4$$

$$f(n) = r^2n - 4$$

$$\hookrightarrow f(-1) = -9$$

(6)

$$Df = (-\infty, 1]$$

(7) (الفصل الرابع) (المسائل) (المسائل)

$$Df \cdot Dg$$

$$Dg = (-\infty, 1]$$

$$\Rightarrow f(n) = g(n)$$

جواب المسألة

(8)

المسألة

$$D_f = [0, +\infty) \quad \left. \begin{array}{l} D_g = [0, +\infty) \end{array} \right\} D_{g \circ f} = \begin{array}{l} \text{if } x \geq 0 \\ x\sqrt{x} = \sqrt{x^3} \Rightarrow f(x) = g(x) \end{array}$$

$$f(x) = [\sqrt{x} - [\sqrt{x}]] \sim D_f = [0, +\infty)$$

$$g(x) = \sqrt{x - |x|} \quad D_g = x - |x| \geq 0 \sim x \geq |x| \Rightarrow [0, +\infty)$$

$$D_{g \circ f}$$

$$g(x) = \begin{array}{l} \text{if } x \geq 0 \\ g(x) = 0 \\ \text{if } x < 0 \\ f(x) = 0 \end{array}$$

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$$[\sqrt{x}] \leq \sqrt{x} < [\sqrt{x}] + 1$$

$$0 \leq \sqrt{x} - [\sqrt{x}] < 1 \rightarrow \text{تعریف} \Rightarrow f(x) = [\sqrt{x} - [\sqrt{x}]] = 0$$

$$a) \rightarrow x=1 \sim f(1)=1, g(1)=1 \Rightarrow \frac{f \circ g}{f \cdot g} = \frac{1+1}{1-1} = 2$$

$$b) x=2 \Rightarrow f(2)=2, g(2)=2 \rightarrow \frac{f+g}{f \cdot g} = \frac{2+2}{2 \cdot 2} = 1$$

$$c) f(0)=0, g(-1)=1 \sim f \circ g(-1) = 0$$

s.a.m

ا) $g(x) = f(x^n - 1)$

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6

$$x^n - 1 = 1 \Rightarrow x = 1$$

$$x^n - 1 = 0 \Rightarrow x = 0$$

$$x^n - 1 = 0 \Rightarrow x = \frac{1}{x}$$

$$x^n - 1 = 1 \Rightarrow x = \frac{1}{x}$$

$$x^n - 1 = 1 \Rightarrow x = -\frac{1}{x}$$

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

ب) hint: $f(x) = f(x^n)$

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$$x^n = 0 \Rightarrow x = 0 \rightarrow f(0) = h(0) = 0$$

$$x^n = 1 \Rightarrow x = \pm 1 \rightarrow f(1) = h(1) = 1$$

$$x^n = -1 \Rightarrow x = \pm i \rightarrow f(i) = h(i) = -1$$

$$h = \left\{ (-1, -1), (-1, 1), (0, 0), (1, 1), (1, -1) \right\}$$