

الفصل 4 / التفاضل / التفاضل الجزئي

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

(1)

$$\begin{cases} x=0 \rightarrow f(0) = \sqrt{0} + \frac{1}{\sqrt{0}} + r \\ x=-r \rightarrow f(-r) = \sqrt{-r} + \frac{1}{\sqrt{-r}} + r \end{cases} \Rightarrow \begin{cases} r(\sqrt{0} + \frac{1}{\sqrt{0}}) = \sqrt{0} + \frac{1}{\sqrt{0}} + a \\ 1\sqrt{-r} + \frac{1}{\sqrt{-r}} = \sqrt{-r} + \frac{1}{\sqrt{-r}} + a \end{cases} \Rightarrow a = -1, \Delta = -\frac{9}{4}$$

(2)

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

$$x = r + \sqrt{r} \Rightarrow \frac{1}{x} = \frac{1}{r + \sqrt{r}} \xrightarrow{\frac{r - \sqrt{r}}{r - \sqrt{r}}} \frac{r - \sqrt{r}}{r^2 - r} = \frac{r - \sqrt{r}}{r(r - \sqrt{r})} = \frac{1}{r} \Rightarrow \frac{1}{x} = \frac{1}{r}$$

$$\left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2 = x + \frac{1}{x} + 2 \sim \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2 = 4 \Rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{4} \Rightarrow f(r + \sqrt{r}) = \sqrt{4} + r$$

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

$$(r f(x) - r f(-x) = (x^2 - x))' \Rightarrow f f(x) - 4 f(-x) = 4x^2 - 2x \quad (3)$$

$$x = -x \Rightarrow (r f(-x) - r f(x) = (x^2 + x))' \Rightarrow 4 f(-x) - 9 f(x) = 12x^2 + 3x$$

$$-5 f(x) = 10x^2 + x$$

$$\hookrightarrow f(x) = \frac{-x - 10x^2}{5}$$

sa.m

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

(3)

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

$$n=-r \Rightarrow rf(0) = 1a + am \Rightarrow r(rm-1) = 1a + am$$

$$rm - r = 1a + am$$

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

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

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

(4)

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

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

$$\hookrightarrow r\left(n + \frac{1}{n}\right) + r(-9) \quad b = -9$$

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

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

(4) (الفصل الرابع) (جواب سؤال) (مراجعة)

$$Df \cdot Dg$$

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

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

جواب سؤال

الفصل الرابع

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

$$f(x) = [\sqrt{x} - [\sqrt{x}]] \sim D_f = [0, +\infty) \quad (1)$$

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

logarithm

$$D_{f \cdot g}$$

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

حداکثر تابع همواره 0 اند

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

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

f(x)

$$(الف) \rightarrow x=1 \sim f(1)=2, g(1)=1 \Rightarrow \frac{f+g}{f-g} = \frac{2+1}{2-1} = 3 \quad (9)$$

$$(ب) x=4 \Rightarrow f(4)=3, g(4)=2 \rightarrow \frac{f+g}{f-g} = \frac{3+2}{3-2} = 5 \quad \text{تعریف نهایی}$$

! 5=2

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

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

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

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

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