

حل المسألة

$$x(f(x+1)) = \frac{1}{x} \Rightarrow a = \frac{1}{\delta}$$

$$a = \frac{1}{\sqrt{2}}, b = \frac{1}{\sqrt{2}} \rightarrow f(a) \cdot f(b) = \sqrt{a} + \sqrt{b} + \frac{1}{\sqrt{a}} + \frac{1}{\sqrt{b}} + 4 = 4(\sqrt{a} + \sqrt{b}) + 4$$

$$(\sqrt{a} + \sqrt{b})^2 = a + b + 2\sqrt{ab} = 1 + 2 = 3 \Rightarrow 2(\sqrt{3}) + 4 = 4 + 2\sqrt{3}$$

$$\begin{aligned} f(x) - f(-x) &= \frac{1}{x} - \frac{1}{-x} = \frac{2}{x} \quad \times 2 \rightarrow 2f(x) - 2f(-x) = \frac{4}{x} \rightarrow -2f(x) = \frac{4}{x} \Rightarrow f(x) = -\frac{2}{x} \\ -f(x) + 2f(-x) &= \frac{1}{x} + \frac{2}{-x} = -\frac{1}{x} \quad \times 2 \rightarrow -2f(x) + 4f(-x) = -\frac{2}{x} \Rightarrow 4f(-x) = -\frac{2}{x} \Rightarrow f(-x) = -\frac{1}{2x} \end{aligned}$$

$$f(x) = -\frac{2}{x}$$

$$f(0) = \delta m + 1 \rightarrow x = \frac{1}{\delta} \rightarrow 9m - \frac{1}{\delta} = \delta m + 1 \rightarrow m = \frac{1}{8} \Rightarrow f(0) = \frac{1}{8}$$

$$f(0) = \frac{1}{8} \rightarrow x = 0$$

$$ax + \frac{a}{x} + 4b = \frac{1}{x} \Rightarrow a = \frac{1}{2}, b = -\frac{1}{4} \rightarrow f(x) = \frac{1}{2x} - \frac{1}{4}$$

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

$$D_g \cdot P_A = (1, 1] \quad D_A = D_g = -(1-x)^{\frac{1}{2}} \rightarrow \text{مستقيم}$$

$$D_A = D_g = R^+ \cup \{0\} \rightarrow \text{مستقيم}$$

$$\left. \begin{aligned} 0 &\leq \sqrt{x} - [\sqrt{x}] < 1 \rightarrow f(x) = 0 \\ x &\geq 0: g(x) = \sqrt{x} - x = 0 \end{aligned} \right\} \Rightarrow f = g \text{ مستقيم}$$

$$x < 0: x - |x| = x - (-x) = 2x < 0 \rightarrow \text{صفر}$$

$$\text{الف) } \frac{1+x}{1-x} = -2 \quad \text{ب) } \frac{x+y}{x-y} \rightarrow \text{صفر} \quad \text{ج) } 0 \times 1 = 0$$

$$\text{الف) } g(x) = \left\{ (1, 1), (-1, 1), \left(\frac{1}{2}, 1\right), \left(\frac{1}{3}, 1\right), \left(\frac{1}{4}, 1\right) \right\}$$

$$\text{ب) } h(x) = \left\{ (1, 1), (0, 0), \left(\frac{1}{2}, -1\right), \left(\frac{1}{3}, -1\right), \left(\frac{1}{4}, -1\right) \right\}$$