

①

$$f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \quad \sim \quad \frac{x-1}{x} - \frac{x}{x-1} > 0 \quad \xrightarrow{\text{خرج مشترک}} \frac{x^2 - 2x + 1 - x^2}{x^2 - x} > 0$$

$$\sim \frac{-2x+1}{x^2-x} > 0 \quad \xrightarrow{\text{نقطه بحرانی}} \frac{0}{+} \quad \frac{1}{-} \quad \frac{1}{+} \quad \frac{0}{-} \quad \Rightarrow Df = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right)$$

$$f(x) = \frac{1}{x+1} - \frac{2}{x} \quad \xrightarrow{\text{خرج مابین}} \frac{2}{x-1} + \frac{1}{x+2}$$

$$\Rightarrow Df = \mathbb{R} - \left\{-2, -\frac{5}{2}, -1, 0, 1\right\}$$

خرج مابین
نامایه مشترک

$$\left. \begin{array}{l} x+1 \neq 0 \sim x \neq -1 \quad \text{I} \\ x \neq 0 \quad \text{II} \\ x-1 \neq 0 \sim x \neq 1 \quad \text{III} \\ x+2 \neq 0 \sim x \neq -2 \quad \text{IV} \\ \frac{2}{x-1} + \frac{1}{x+2} \neq 0 \rightarrow \frac{2x+4+x-1}{x^2+x-2} = \frac{3x+3}{(x+2)(x-1)} \neq 0 \\ \Rightarrow 3x+3 \neq 0 \sim x \neq -\frac{3}{3} \quad \text{V} \end{array} \right\} \cup$$

②

$$f(x) = \sqrt{\left(\left(\frac{1}{x}\right)^x - 9\right)(2x-4^x)} \quad \sim \quad \left(\frac{1}{x^x} - 9\right)(2x-4^x) > 0$$

$$\text{If } x = -2 \rightarrow 0$$

$$\text{If } x = 2/5 \rightarrow 0$$

$$\star \text{ مبنی بر معین علامت عددی دهم} \quad x = 10 \sim \oplus$$

$$Df = (-\infty, -2] \cup [2/5, +\infty)$$

$$f(x) = \sqrt{x-1} + \sqrt{y+1} = 3 \quad x-1 > 0 \sim x > 1 \quad \text{I}$$

$$\sqrt{y+1} = 3 - \sqrt{x-1} \quad \xrightarrow{\text{محدود مثبت}} \quad 3 - \sqrt{x-1} > 0 \quad \xrightarrow{\text{محدود مثبت}} \quad 3 > \sqrt{x-1} \quad \xrightarrow{\text{مربع}} \quad 9 > x-1$$

$$\Rightarrow Df = [1, 10]$$

$$10 > x \quad \text{II}$$

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

$$\text{I} \sim x^2 - x - 2 > 0 \sim (x-2)(x+1) > 0 \quad \xrightarrow{\text{نقطه بحرانی}} \frac{-1}{+} \quad \frac{2}{-} \quad \frac{2}{+}$$

$$\text{I} = (-\infty, -1) \cup (2, +\infty)$$

$$\text{II} \sim x^2 - 1 > 0 \sim (x-1)(x+1) > 0$$

$$\frac{-1}{+} \quad \frac{1}{-} \quad \frac{1}{+}$$

$$\text{II} = (-\infty, -1] \cup [1, +\infty)$$

$$\text{III} \quad \sqrt{x^2-1} \neq -1 \quad \xrightarrow{\text{محدود برقرار است}}$$

$$\Rightarrow Df = \text{I} \cap \text{II} = (-\infty, -1) \cup (2, +\infty)$$

③

(۴)

$$f(x) = \sqrt{3+ax-x^2} \sim \begin{cases} x^2+ax+3 \geq 0 \end{cases}$$

$$Df = [-2, b]$$

$$\frac{-2}{-} \quad \frac{b}{-} \rightarrow \text{If } x = -2 \rightarrow 0 \Rightarrow -4-2a+3 \geq 0$$

$$a = -\frac{1}{2}$$

$$\rightarrow -x^2 - \frac{1}{2}x + 3 \geq 0 \quad \frac{c}{a} = p \quad -3 = -2 \times b \sim b = \frac{3}{2}$$

$$* a+b = -\frac{1}{2} + \frac{3}{2} = 1$$

$$f(x) = \begin{cases} 2x-2 & ; x \geq 1 \\ 2x+3 & ; x < 1 \end{cases} \xrightarrow{*} \begin{cases} 2x-2 \geq x & - 2x-2 \geq 0 \sim x \geq 1 \quad \checkmark \quad I \\ 2x+3 \geq x & \sim x+3 \geq 0 \sim x \geq -3 \quad \times \end{cases}$$

(۵)

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

$$\sim f(x) - x \geq 0 \sim f(x) \geq x$$

مای دایم، قطع من وایم به این معنی است

عدد کمتر از ۱ به معنی است:

$$-3 \leq x < 1 \quad \checkmark \quad II$$

$$I \cup II, Dg = [-3, +\infty)$$

$$f(x) = \begin{cases} (a+1)(x+2) & ; x \geq 1 \\ 2a+2x & ; x < 1 \end{cases}$$

(۶)

$$2f(a) = f(-2) + a \sim 2(va+v) = 2a-4+a$$

$$14a+14 = 3a-4$$

$$10a = -18 \sim a = -1.8$$

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

$$2 - \sqrt{2} = x_1$$

$$2 + \sqrt{2} = x_2$$

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

$$\sqrt{x_1 x_2} = t$$

$$\Rightarrow f(x_1) = \frac{1}{t} + t + 2 \quad f(x_2) = t + \frac{1}{t} + 2 \quad \Rightarrow 2(t + \frac{1}{t} + 2) \Rightarrow 2(\sqrt{6} + 2) = 2 + 2\sqrt{6}$$

$$2 + \frac{1}{2} = 2 + \sqrt{2} + 2 - \sqrt{2} = 4$$

$$\sim (t + \frac{1}{t})^2 = t^2 + \frac{1}{t^2} + 2 = 4 + 2 = 6 \sim t + \frac{1}{t} = \sqrt{6}$$

(۷)

باردیم سر B

معین نصی

تکلیف شماره ۴

$$2f(x) - 3f(-x) = \varepsilon x^2 - 2x \quad \xrightarrow{\text{مبدن } x, -x} \Rightarrow x = -x \rightarrow 2f(-x) - 3f(x) = \varepsilon x^2 + 2x \quad (1)$$

$$\Rightarrow \begin{cases} (2f(x) - 3f(-x) = \varepsilon x^2 - 2x) \times 2 \\ (2f(-x) - 3f(x) = \varepsilon x^2 + 2x) \times 3 \end{cases}$$

$$\oplus \quad \frac{-5f(x) = 10x^2 + 2x}{-5f(x) = 10x^2 + 2x}$$

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

$$(n+2)f(x) - 3xf(x+2) = \varepsilon x^2 - mx + 3m - 1$$

$$x = -2 \rightarrow \begin{cases} 4f(0) = 5m + 1 \end{cases}$$

$$x = 0 \rightarrow \begin{cases} 2f(0) = 3m - 1 \end{cases} \times 2 \rightarrow 4f(0) = 6m - 2 \rightarrow 2f(0) = 3m - 1$$

$$\Rightarrow 6m - 2 = 5m + 1 \Rightarrow m = 3$$

$$3m = 9$$

$$m = \frac{9}{2} = \frac{9}{2}$$

$$f(0) = \frac{2 \times 9}{2} - \frac{2}{2} = \frac{16}{2} = 8 = f(0)$$

$$f(x) + f\left(\frac{1}{x}\right) = \frac{3x^2 - 12x + 3}{2x}$$

$$x = -1 \rightarrow f(-1) + f(-1) = \frac{3 + 12 + 3}{-2} \rightarrow 2f(-1) = -9$$

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