

دوره اول - فصل دوم - باب اول - فصل اول

$$i) f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \quad \begin{matrix} x \neq 0 \\ x \neq 1 \end{matrix} \left\{ \begin{matrix} f(x) = \sqrt{\frac{(x-1)^2 - x^2}{x(x-1)}} \rightarrow \frac{0}{0} \end{matrix} \right.$$

$$D_f = (-\infty, 0) \cup (0, 1)$$

$$- \rightarrow \frac{\frac{1}{x-1} - \frac{x}{x}}{\frac{1}{x-1} + \frac{1}{x-1}} \quad \begin{matrix} x \neq 0 \\ x \neq 1 \\ x \neq -1 \end{matrix} \Rightarrow \frac{\frac{1}{x-1} - \frac{x}{x}}{\frac{1}{x-1} + \frac{1}{x-1}} = \frac{\frac{1-x}{x(x-1)}}{\frac{1+x}{x(x-1)}} = \frac{1-x}{1+x} \neq 0 \Rightarrow \frac{1-x}{1+x} = 0 \Rightarrow x = 1$$

$$D_f = \mathbb{R} - \{0, 1, -1, -\frac{1}{x}\}$$

$$ii) f(x) = \sqrt{(1/x)^2 - 9} \quad \begin{matrix} x \neq 0 \\ x \neq \pm 1/3 \end{matrix} \left\{ \begin{matrix} f(x) = \sqrt{\frac{1-9x^2}{x^2}} \rightarrow \frac{0}{0} \end{matrix} \right. \quad D_f = (-\infty, -1/3) \cup (1/3, +\infty)$$

$$- \rightarrow \sqrt{y+1} \leq x - \sqrt{x-1} \quad \begin{matrix} x-1 \geq 0 \Rightarrow x \geq 1 \\ x - \sqrt{x-1} \geq 0 \Rightarrow x \geq \sqrt{x-1} \Rightarrow x-1 \leq 1 \Rightarrow x \leq 2 \end{matrix}$$

$$D_f = [1, 2]$$

$$f(x) = \frac{\log_e(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1} \quad \begin{matrix} x^2 - x - 2 > 0 \Rightarrow x < -1 \text{ or } x > 2 \\ x^2 - 1 > 0 \Rightarrow x < -1 \text{ or } x > 1 \end{matrix} \left\{ \begin{matrix} D_f = (-\infty, -1) \cup (2, +\infty) \end{matrix} \right.$$

$$-x - 2a + c > 0 \Rightarrow -2a - 1 > 0 \Rightarrow a < -0.5$$

$$y = \sqrt{-x^2 - 4x + 4} \quad \begin{matrix} -x^2 - 4x + 4 \geq 0 \Rightarrow x \in [-4, 2] \end{matrix}$$

$$g(x) = \sqrt{f(x) - x} \Rightarrow f(x) - x \geq 0 \Rightarrow \begin{matrix} 2x - 2 \geq 0 \Rightarrow x \geq 1 \\ x + c \geq 0 \Rightarrow x \geq -c \end{matrix} \Rightarrow D_g = [-c, +\infty)$$

$$\sin \frac{\pi}{6} = \cos \frac{\pi}{3} = \frac{\sqrt{3}}{2} \rightarrow f(x) = x(\sqrt{x} - \sqrt{x}) = \frac{(\sqrt{x} - \sqrt{x})(\sqrt{x} - \sqrt{x})}{\sqrt{x}} = \frac{0}{\sqrt{x}} = 0$$

$$f(x) = \frac{a+1}{a-1} \quad a \neq 1 \quad f(f(x)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{a+1}{a-1} = a \quad \left\{ \begin{matrix} a \in \mathbb{R} - \{1\} \end{matrix} \right.$$

$$t^2 - kt + k = 0 \Rightarrow (t-r)^2 = 0 \Rightarrow \underline{t=r}$$

$$\sqrt{a^2-1} = r \Rightarrow a^2 = d \Rightarrow a = \pm \sqrt{d}$$

$$f(-4+4) \times f(1+4) = (-4)^2 - 4(-4) + 4)(1-4+4) = 122$$

$$kt^2 + dt - 4d = 0 \Rightarrow t^2 + dt - 1k = 0 \Rightarrow t = \underline{\underline{-\frac{d}{2} \pm \frac{1}{2}\sqrt{d^2 + 4k}}}$$

$$\Rightarrow \cos x = \frac{1}{\sqrt{2}} \Rightarrow \text{we have } x = \frac{\pi}{4} \text{ or } x = \frac{3\pi}{4} \Rightarrow \tan^2 x = (1)^2 = \underline{\underline{1}}$$