

۱۹۵۵ آفرین

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره: کلاس: الف) $\sqrt{\frac{x^2 - \mu x + 1}{x(x-1)}}$ $\frac{-\mu x + 1}{x(x-1)} \geq \frac{1}{\mu}$ $\frac{1}{x(x-1)} \geq \frac{1}{\mu}$ $x(x-1) \leq \mu$ $x^2 - x - \mu \leq 0$ + - + - Df = $(-\infty, 0) \cup [\frac{1}{\mu}, 1)$	ب) $\frac{1}{x+1} - \frac{\mu}{x} \geq 0$ $\frac{\mu}{x-1} + \frac{1}{x+\mu} \geq 0$ $\frac{\mu(x+\mu) + (x-1)}{(x-1)(x+\mu)} \geq 0$ $\mu x + \mu^2 + x - 1 \geq 0$ $x(\mu+1) + (\mu^2 - 1) \geq 0$ $x(\mu+1) \geq 1 - \mu^2$ $x \geq \frac{1 - \mu^2}{\mu+1}$ $x \geq 1 - \mu$ Df = $\mathbb{R} - \{-1, 0, 1, -\mu, -\frac{\mu}{\mu+1}\}$
الف) $f(x) = \sqrt{(\frac{1}{\mu}x - 9)(\mu x - x^2)}$ $\frac{1}{\mu}x - 9 = 0 \Rightarrow x = 9\mu$ $\frac{1}{\mu}x = 9 \Rightarrow x = 9\mu$ $x = -\mu$ $\mu x = x^2 \Rightarrow x = 0$ $x = \frac{\mu}{\mu}$ Df = $(-\infty, \mu] \cup [\frac{\mu}{\mu}, +\infty)$	ب) $\sqrt{x-1} + \sqrt{y+1} = \mu$ $x-1 \geq 0 \Rightarrow x \geq 1$ $y+1 \geq 0 \Rightarrow y \geq -1$ Df = $[1, +\infty) \cup [-1, +\infty)$
$(x^2 - x - \mu)$ $\frac{\log x}{\sqrt{x^2 - 1} + 1}$ $x^2 - x - \mu > 0$ $(x-\mu)(x+1) > 0$ $\frac{-1}{\mu} < x < \mu$ Df = $(-\infty, -1) \cup (\mu, +\infty)$	ب) $\sqrt{x-1} + \sqrt{y+1} = \mu$ $x-1 \geq 0 \Rightarrow x \geq 1$ $y+1 \geq 0 \Rightarrow y \geq -1$ Df = $[1, +\infty) \cup [-1, +\infty)$
$f(x) = \sqrt{\mu + ax - x^2}$ $x = -\mu \Rightarrow \mu - \mu a - \mu = 0$ $\mu a = -1$ $a = -\frac{1}{\mu}$ $f(x) = \sqrt{-(x - \frac{\mu}{2})^2 + \frac{\mu^2}{4}}$ $\mu \geq 0 \Rightarrow x \leq \frac{\mu}{2}$ Df = $[-\mu, \frac{\mu}{2}]$	ب) $\sqrt{x-1} + \sqrt{y+1} = \mu$ $x-1 \geq 0 \Rightarrow x \geq 1$ $y+1 \geq 0 \Rightarrow y \geq -1$ Df = $[1, +\infty) \cup [-1, +\infty)$
$f(x) = \begin{cases} \mu x - \mu & x \geq 1 \\ \mu x + \mu & x < 1 \end{cases}$ $f(x) \geq 1 \Rightarrow \sqrt{\mu x - \mu - x} = \mu x - \mu \geq 0 \Rightarrow x \geq 1$ $f(x) < 1 \Rightarrow \sqrt{\mu x + \mu - x} = \mu x + \mu > 0 \Rightarrow x < 1$ Df = $[-\mu, +\infty)$	ب) $\sqrt{x-1} + \sqrt{y+1} = \mu$ $x-1 \geq 0 \Rightarrow x \geq 1$ $y+1 \geq 0 \Rightarrow y \geq -1$ Df = $[1, +\infty) \cup [-1, +\infty)$

$$\sin \frac{\pi}{\mu} = \frac{\sqrt{\mu}}{\mu}$$

$$\cos \mu \pi = 1$$

$$f\left(\frac{\sqrt{\mu} + \mu}{\mu}\right)$$

$$\mu \left(\frac{\sqrt{\mu} + \mu}{\mu}\right)^{\mu} - f\left(\frac{\sqrt{\mu} + \mu}{\mu}\right)$$

$$\frac{\sqrt{\mu} + \mu}{\mu} - \frac{\sqrt{\mu} + \mu}{\mu} = -\frac{1}{\mu}$$

2

$$f(a) = \frac{a+1}{a-1}$$

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

$$a \in \mathbb{R} - \{1\}$$

2

$$f(x) = x^{\mu} - f x$$

$$g(x) = \sqrt{x^{\mu} - 1}$$

$$f(g(a)) = -f$$

$$f(\sqrt{a^{\mu} - 1}) = -f$$

$$a^{\mu} - 1 - f(\sqrt{a^{\mu} - 1}) = -f$$

$$\frac{a^{\mu} + \mu}{f} = \frac{\sqrt{a^{\mu} - 1}}{f}$$

$$\mu \downarrow$$

$$\frac{a^{\mu} + 9 + 4a^{\mu}}{14} = a^{\mu} - 1$$

$$a^{\mu} + 9 + 4a^{\mu} - 14a^{\mu} + 14 = 0$$

$$a^{\mu} - 1 + a^{\mu} + \mu = 0 \quad (a^{\mu} - 1)^{\mu} = 0 \quad a^{\mu} = 1$$

2

$$a = \pm \sqrt{\mu}$$

$$x + \mu = t$$

$$x = t - \mu$$

$$f(t) = (t - \mu)^{\mu} - \mu(t - \mu) + 9$$

$$" = t^{\mu} - 9t + 9 - \mu t + 10 + 9$$

$$" = t^{\mu} - 11t + 19$$

$$f(x) = x^{\mu} - 11x + 19$$

$$f(-\mu) = 9 + \mu\mu + \mu = \sqrt{\mu}$$

$$f(f) = 14 - f f + \mu = \mu$$

$$\sqrt{\mu} \times \mu = 14f$$

2

$$f \cos^{\mu} x + \mu \cos x - \mu = 0$$

$$\cos x = \frac{-\mu \pm \sqrt{\mu^2 + \mu}}{\mu} = \frac{1}{\mu}, \frac{\sqrt{\mu}}{\mu}$$

$$\downarrow$$

$$\tan^{\mu} \frac{\pi}{\mu} = (\sqrt{\mu})^{\mu} = \mu$$

2

$\text{ج-۲) } \sqrt[4]{x-1} + \sqrt{y+1} = 3 \quad , \quad \underbrace{\sqrt{y+1}}_{\text{مجموعه نامتناهی!}} = \underbrace{3 - \sqrt[4]{x-1}}_{\text{مجموعه نامتناهی!}} \rightarrow 3 - \sqrt[4]{x-1} \geq 0 \rightarrow \sqrt[4]{x-1} \leq 3 \rightarrow x \leq 82 \quad \text{II}$

$\downarrow$
 $x-1 \geq 0 \rightarrow x \geq 1 \quad \text{I}$

$\text{I, II} \rightarrow 1 \leq x \leq 82 \rightarrow D_f = [1, 82]$