

۱۹,۲۵
آزمین

نام و نام خانوادگی! پسر (خانم) پاسخنامه تشریحی تکلیف شماره .. (ن) .. کلاس ..

۱) $f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \rightarrow \frac{x^2+1-2x-x^2}{x^2-x} = \frac{1-2x}{x(x-1)}$ $\frac{1}{x} - \frac{2}{x-1}$ $D_f = (-\infty, 0) \cup (\frac{1}{2}, 1)$

۲) $f(x) = \frac{\frac{1}{x-1} - \frac{2}{x}}{\frac{x}{x-1} + \frac{1}{x}}$ $\frac{x-2x-2}{x(x+1)} \rightarrow 0, -1$ $D_f = R - \{0, -1, -\frac{2}{3}, 1, 2\}$

الف) $f(x) = \sqrt{(\frac{1}{x})^2 - 9} = \sqrt{\frac{1}{x^2} - 9}$ $(\frac{1}{x})^2 - 9 \geq 0 \Rightarrow x = -2$ $\frac{-2}{x} - 9 \geq 0 \Rightarrow 2 \geq \frac{9x}{x-2} \Rightarrow x > 2/18$ $D_f = (-\infty, 2/18) \cup [2, +\infty)$

ب) $\sqrt{y+1} = 3 - \sqrt{x-1} \rightarrow \sqrt{y+1} + \sqrt{x-1} = 3$ $\sqrt{y+1} \leq 3 \rightarrow y+1 \leq 9 \rightarrow y \leq 8$ $\sqrt{x-1} \geq 0 \rightarrow x \geq 1$ $D_f = [1, 8]$

$f(x) = \frac{\ln(x^2-x-2)}{\sqrt{x-1}+1}$ $x^2-x-2 \geq 0 \Rightarrow x \leq -1$ $\frac{-1}{x} - \frac{2}{x-1} \geq 0 \Rightarrow \frac{-1}{x} \geq \frac{2}{x-1} \Rightarrow x \leq -1$ $D_f = (-\infty, -1) \cup (2, +\infty)$

ج) $\sqrt{x-1} + 1 \geq 0 \Rightarrow x \geq 1$ $\frac{-1}{x} + \frac{1}{x-1} \geq 0 \Rightarrow \frac{-1}{x} \geq -\frac{1}{x-1} \Rightarrow x \geq 2$ $D_f = (-\infty, -1) \cup (2, +\infty)$

$f(x) = \sqrt{3+2x-x^2}$ $3+2x-x^2 \geq 0 \Rightarrow x \leq 3$ $\frac{-2}{x} + \frac{2}{x-1} \geq 0 \Rightarrow \frac{-2}{x} \geq -\frac{2}{x-1} \Rightarrow x \geq 1$ $D_f = [1, 3]$

$g(x) = \begin{cases} \sqrt{2x-2} & x \geq 1 \\ \sqrt{x+3} & x < 1 \end{cases}$ $2x-2 \geq 0 \Rightarrow x \geq 1$ $x+3 \geq 0 \Rightarrow x \geq -3$ $D_f = [-3, +\infty)$

$$\frac{\sqrt{r}}{r} + 1 = \frac{r + \sqrt{r}}{r}$$

$$r \left(\frac{r + \sqrt{r}}{r} \right)^r = r \cdot \frac{r + \sqrt{r}}{r} = \frac{r + r + \sqrt{r}}{r} = \frac{1 + \sqrt{r}}{r} = \frac{-1}{r} \quad \text{D}$$

6

$$f(f(a)) = a$$

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

$D_f = \mathbb{R} - \{1\}$

7

$$f(a) = -\epsilon \Rightarrow a^r - \epsilon a + \epsilon = 0 \Rightarrow a = r$$

$$g(a) = r \Rightarrow \sqrt{a^r - 1} = r \Rightarrow a^r - 1 = r^2 \Rightarrow a^r = r^2 + 1 \Rightarrow a = \pm \sqrt[r]{r^2 + 1} \quad \text{D}$$

8

$$f(x+r) = x^r - \delta x + r$$

$$f(\epsilon) = 1 - \delta \epsilon + r$$

$$f(-r) = r^r + r^0 + r = r^r \quad \left. \begin{array}{l} f(\epsilon) = 1 - \delta \epsilon + r \\ f(-r) = r^r + r^0 + r = r^r \end{array} \right\} r^r = 1 \quad \text{D}$$

9

$$\epsilon \cos \theta + \delta \cos \theta = \frac{r}{r} \Rightarrow \epsilon \cos \theta + \delta \cos \theta - \frac{r}{r} = 0$$

$$\hookrightarrow \cos \theta + \delta \cos \theta - 1 = 0 \quad \begin{array}{l} \cos \theta = \frac{r}{r} \Rightarrow \theta = \frac{\pi}{r} \\ \cos \theta = \frac{-r}{r} \end{array}$$

$$f\left(\frac{r}{r}\right) = \tan\left(\frac{\pi}{r}\right) = r \quad \text{D}$$

10

ب- ۲) $\sqrt[n]{x-1} + \sqrt{y+1} = 3$, $\underbrace{\sqrt{y+1}}_{\text{موازیانها!}} = \underbrace{3 - \sqrt[n]{x-1}}_{\text{موازیانها!}} \rightarrow 3 - \sqrt[n]{x-1} \geq 0 \rightarrow \sqrt[n]{x-1} \leq 3 \rightarrow n \leq 12$ I

$\downarrow$
 $x-1 \geq 0 \rightarrow x \geq 1$ I

I, II $\rightarrow 1 \leq x \leq 12 \rightarrow D_f = [1, 12]$

۳- $\log_e^{x^2-x-2} \rightarrow x^2-x-2 > 0 \rightarrow (x-2)(x+1) > 0$ $\frac{-1 \pm 2}{+ \phi - \phi +}$ $\rightarrow x > 2 \leq x < -1$ I

$\sqrt{x^2-1} + 1 \rightarrow \text{موازیانها!} \rightarrow \sqrt{x^2-1} \rightarrow x^2-1 \geq 0 \rightarrow x \geq 1 \leq x \leq -1$ II

I, II $\rightarrow x < -1$, $x > 2 \rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$
