

۲. آزمون خوب نوشتن

شماره تکلیف ۵

یازدهم دضتر A

کیمیاء صغائی

① الف) $\sqrt{\frac{x-1}{x} - \frac{x}{x-1}}$

$$\frac{x-1}{x} - \frac{x}{x-1} \geq 0 \rightsquigarrow \frac{-2x+1}{x(x-1)} \geq 0 \quad D_f = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right)$$

ب) $\frac{1}{x+1} - \frac{2}{x} = 0$

$$\frac{1}{x-1} + \frac{1}{x+2} - 2 = 0 \quad \frac{1}{x-1} + \frac{1}{x+2} \neq 0 \rightsquigarrow \frac{x^2 + 4 + x - 1}{x^2 + 2x - x - 2} = 0 \rightsquigarrow x^2 + 3x - 2 = 0 \rightsquigarrow x = -\frac{3 \pm \sqrt{33}}{2}$$

$D_f = R - \left\{ -2, -1, -\frac{3}{2}, 0 \right\}$

② الف) $\sqrt{\left(\left(\frac{1}{x}\right)^x - 9\right)(3x - 4^x)}$

$$\left. \begin{array}{l} x^{-x} \geq 9 \rightsquigarrow -x \geq 2 \rightsquigarrow x \leq -2 \\ 3x - 4^x \geq 0 \rightsquigarrow x \leq \frac{4}{3} \end{array} \right\} \begin{array}{l} x \leq -2 \text{ هر دو + یا صفر} \\ x \geq \frac{4}{3} \text{ هر دو منفی} \end{array} \quad D_f = (-\infty, -2] \cup \left[\frac{4}{3}, +\infty\right)$$

ب) $\sqrt{x-1} + \sqrt{4+1} = 3 \rightsquigarrow \sqrt{x-1} - 3 = -\sqrt{4+1} \rightsquigarrow \sqrt{x-1} - 3 \leq 0 \rightsquigarrow \sqrt{x-1} \leq 3 \rightsquigarrow x-1 \leq 9 \rightsquigarrow x \leq 10$
 $x \geq 1 \rightsquigarrow D_f = [1, 10]$

③ $x^2 - x - 2 > 0 \rightsquigarrow \frac{-1 \pm \sqrt{1+8}}{(x+1)(x-2)} \quad \left| \frac{-1 \pm 3}{(x+1)(x-2)} \right| \quad D_f = (-\infty, -1) \cup (2, +\infty)$
 $\sqrt{x^2-1} + 1 \rightarrow x^2-1 \geq 0 \rightarrow x^2 \geq 1 \rightarrow x \geq 1, x \leq -1$
 $\hookrightarrow \sqrt{x^2-1} + 1 \neq 0 \rightarrow \sqrt{x^2-1} \neq -1 \quad \checkmark$

④ $-x^2 + ax + 3 \geq 0 \quad [x_1, x_2]$
 $a+b = \frac{3}{1} - \frac{1}{1} = 2$
 $-x^2 + ax + 3 = 0 \rightsquigarrow -x^2 + 2x + 3 = 0 \rightsquigarrow x^2 - 2x - 3 = 0 \rightsquigarrow x = -1, 3$
 $\therefore D_f = [-1, 3]$

$$\textcircled{2} \quad f(x) - x \geq 0 \rightarrow f(x) \geq x \quad \begin{matrix} x \geq 1 \\ x < 1 \end{matrix} \quad \begin{matrix} 3x - r - x \geq 0 \rightarrow x \geq 1 \\ rx + \frac{r-r}{x+r} - x \geq 0 \rightarrow x \geq -r \end{matrix} \quad \left. \begin{matrix} \\ \end{matrix} \right\} D_f[-r, +\infty) \quad \textcircled{2}$$

$$\textcircled{3} \quad \left. \begin{matrix} f(x) = rx^r - fx \sim rx(x-r) \\ f(\sin \pi + \cos \pi) \\ \frac{\sqrt{r}}{r} + 1 \rightarrow \frac{r+\sqrt{r}}{r} \end{matrix} \right\} \rightarrow x \frac{r+\sqrt{r}}{r} \left(\frac{-r+\sqrt{r}}{r} \right) = \frac{r-f}{r} = \frac{-1}{r} \quad \textcircled{3}$$

$$\textcircled{4} \quad f(x) = \frac{x+1}{x-1}$$

$$f(a) = \frac{a+1}{a-1}, \quad f(f(a)) = \frac{f(a)+1}{f(a)-1} \rightarrow \frac{\frac{a+1}{a-1}+1}{\frac{a+1}{a-1}-1} \rightarrow \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a-1}{a-1}} = \frac{2a}{-2} = -a \quad \textcircled{4}$$

مصفوفة $a \neq 1$
 $a=1$ غير

$$\textcircled{5} \quad f(g(a)) = -f$$

$$g(a) = r \rightarrow \sqrt{a^r - 1} = r \rightarrow a^r - 1 = r$$

$$a = \sqrt[r]{r+1}$$

$$x^r - fx + r = 0 \quad (x-r)^r \rightarrow x=r \quad \textcircled{5}$$

$$\textcircled{6} \quad f(x+r) = x^r - ax + y$$

$$\left. \begin{matrix} x=1 \rightarrow f(1) = 1 - a + y = r \\ x=-y \rightarrow f(-r) = r^r + r^0 + y = \sqrt{r} \end{matrix} \right\} \text{iff} \quad \textcircled{6}$$

$$\frac{r^0}{1} = \frac{y}{r}$$

$$\textcircled{7} \quad f(r \cos^r + a \cos) = \tan^r \rightarrow f\left(\frac{r}{\sqrt{a}}\right)$$

$$r \cos^r + a \cos = \frac{r}{\sqrt{a}} \quad \cos = t \quad rt^r + at = \frac{r}{\sqrt{a}} \rightarrow 1t^r + 1t - \frac{r}{a} = 0 \rightarrow t = \frac{-1 \pm \sqrt{1 + \frac{4r}{a}}}{2} \rightarrow \frac{1}{r} \sqrt{a} \quad \textcircled{7}$$

$\frac{1}{r} \sqrt{a}$
 $-\frac{r}{a}$ غير

$$\cos = \frac{1}{r} \tan^r \rightarrow \frac{\sin^r}{\cos^r} \rightarrow \frac{1}{\frac{1}{r}} = r \quad \textcircled{7}$$