

عسل کا درس

سوال ← $f(x) = \sqrt{\frac{x-1}{x}} - \frac{x}{x-1} \Rightarrow \frac{x-1}{x} - \frac{x}{x-1} \geq 0$

$\rightarrow \frac{x^2 - 2x + 1 - x^2}{x(x-1)} \geq 0 \rightarrow \frac{1-2x}{x(x-1)} \geq 0$ تقسیم عدلات

0 1/2 1
|-----|
- + - +
 $\rightarrow Pf: (-\infty, 0) \cup [\frac{1}{2}, 1)$

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

$\rightarrow \frac{x - 2x - 2}{x^2 + 3x + 2} \rightarrow \{x+2 \neq 0 \rightarrow x \neq -2\}$
 $\frac{3x+4x-1}{(x-1)(x+2)} \rightarrow x^2 + x - 2 \neq 0 \rightarrow x \neq -1$
 $x \neq -2$

$x+1 \neq 0 \rightarrow x \neq -1$

$x \neq 0 \rightarrow Pf = \mathbb{R} - \{-2, -1, 0\}$

سوال ← $\sqrt{\left(\frac{1}{3}\right)^x - 9} \geq 0 \Rightarrow x \geq 2$

$3^x - 9 \geq 0 \rightarrow x = \frac{\ln 9}{\ln 3}$

$\frac{-2}{+1} - \frac{\frac{\ln 9}{\ln 3}}{+1} \rightarrow Pf: (-\infty, -2] \cup [\frac{\ln 9}{\ln 3}, +\infty)$

ب) $\sqrt{x-1} + \sqrt{y+1} = 3 \rightarrow \sqrt{x-1} = 3 - \sqrt{y+1}$
① $\rightarrow x-1 \geq 0 \rightarrow x \geq 1$ ② $\rightarrow 3 - \sqrt{y+1} \geq 0 \rightarrow 3 \geq \sqrt{y+1}$

Subo

$\rightarrow 9 \geq y+1 \rightarrow y \leq 8$
 $\rightarrow Pf: [1, 8]$

$$f(x) = \log_{\frac{1}{e}}(x^2 - x - 2)$$

$$\sqrt{x^2 - 1} + 1$$

- سوال 3
- ① $x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0$
- ② $\sqrt{x^2 - 1} \geq 0 \rightarrow x^2 - 1 \geq 0 \rightarrow (x-1)(x+1) \geq 0$
- ③ $\sqrt{x^2 - 1} \neq -1$ همیشه درست است
دقیق درست برابر با 1 نیست

→ ① $\frac{-1}{+1} \rightarrow (-\infty, -1) \cup (2, +\infty)$

② $\frac{-1}{+1} \rightarrow (-\infty, -1) \cup (1, +\infty)$

$\cap \rightarrow Df = (-\infty, -1) \cup (2, +\infty)$

سوال 5

$$\sqrt{x^2 + ax - x^2} \Rightarrow -x^2 + ax + 3 = 0 \rightarrow x^2 - \frac{a}{2}x - 3 = 0$$

→ $a = \frac{1}{2} \rightarrow -x^2 + \frac{1}{2}x + 3 \geq 0 \rightarrow x^2 - \frac{1}{2}x - 3 \leq 0$

→ $\sqrt{\Delta} = \sqrt{\frac{1}{4} + 12} = \frac{5}{2} \Rightarrow \frac{1}{2} \pm \frac{5}{2}$

$[-2, 3] \Rightarrow [-2, 1/5] \rightarrow a+b \leq 0 \Rightarrow -1/5 \leq a \leq 1/5$

$b = -1/5$

$$f(x) = \begin{cases} 3x-2 & x > 1 \\ 2x+3 & x < 1 \end{cases}$$

سوال 6

① $3x-2-x \geq 0 \rightarrow x \geq 1$

② $2x+3-x \geq 0 \Rightarrow x \geq -3$

$x < 1 \rightarrow -3 \leq x < 1$

$\cap \rightarrow Df = [-3, +\infty)$

سوال 7

$$f(x) = \begin{cases} (a+1)(x+2) & x > 1 \rightarrow f(2) = (a+1)(2+2) = 4a+4 \\ 2a+3x & x \leq 1 \rightarrow f(1) = 2a+3 \end{cases}$$

$f(1) = 2f(2) + a \rightarrow 2(4a+4) = 2a+3 \Rightarrow 8a+8 = 2a+3 \Rightarrow 6a = -5 \Rightarrow a = -5/6$

$\cap \rightarrow Df = [-5/6, 1]$

$$f(x) = \sqrt{x+1} - \frac{1}{\sqrt{x}} + 2 \quad \text{سوال ٧} \rightarrow \sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 2$$

$$\frac{1}{\sqrt{2-\sqrt{3}}} \times \frac{\sqrt{2+\sqrt{3}}}{\sqrt{2+\sqrt{3}}} = \frac{\sqrt{2+\sqrt{3}}}{\sqrt{4-3}} = \sqrt{2+\sqrt{3}}$$

$$\rightarrow \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + 2$$

$$\textcircled{2} \rightarrow \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 2$$

$$\rightarrow \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} + 2$$

$$\rightarrow \textcircled{1} + \textcircled{2} \rightarrow \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + 2 + 2$$

$$= (2\sqrt{2-\sqrt{3}} + 2\sqrt{2+\sqrt{3}}) + 4 \Rightarrow a \rightarrow 2(\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}) + 4$$

$$\text{با ضرب کردن} \rightarrow a^2 = 2 - \sqrt{3} + 2 + \sqrt{3} + 2 = a^2 \Rightarrow 4 \rightarrow a = \sqrt{4}$$

$$\boxed{2(\sqrt{4}) + 4} \rightarrow \text{جواب}$$

$$(yf(x) - xf(-x))_x = \{x^2 - x\} / a^3 \quad \text{سوال ٨} \rightarrow$$

$$(yf(x) - xf(-x))_x = \{x^2 + x\} \times 2$$

$$\cancel{yf(x)} - af(-x) = 12x^2 - 3x$$

$$\{f(-x) - \cancel{yf(x)}\} = 12x^2 + 3x$$

$$-af(-x) = 12x^2 - 3x \rightarrow f(-x) = -\{12x^2 + 3x\}$$

$$\rightarrow f(x) = -\{12x^2 - 3x\}$$

$$(x+2)f(x) - xf(x+2) = \{x^2 - mx + 3m-1\} \quad \text{سوال ٩} \rightarrow$$

$$\rightarrow x=2 \rightarrow -4f(0) = \{(-2)^2 - m(-2) + 3m-1\} = 14 + 2m + 3m - 1 \rightarrow 5m + 13$$

$$\rightarrow x=0 \rightarrow 2f(0) = \{0^2 - m(0) + 3m-1\} \rightarrow 3m-1$$

$$\text{Subo} \rightarrow \boxed{f(0) = 4/13}$$

$$f(x) = ax + b \quad \left. \begin{array}{l} f\left(\frac{1}{x}\right) = \frac{a}{x} + b \end{array} \right\} \textcircled{+} \rightarrow ax + b + \frac{a}{x} + b = \frac{3x^2 - 12x + 7}{x} \quad \leftarrow \text{سراشا}$$

$$\rightarrow ax + \frac{a}{x} + 2b = 3x - 12 + \frac{7}{x} \rightarrow a = 3$$

$$b = -7$$

$$\rightarrow f(-1) \rightarrow 3(-1) - 7 = -10$$