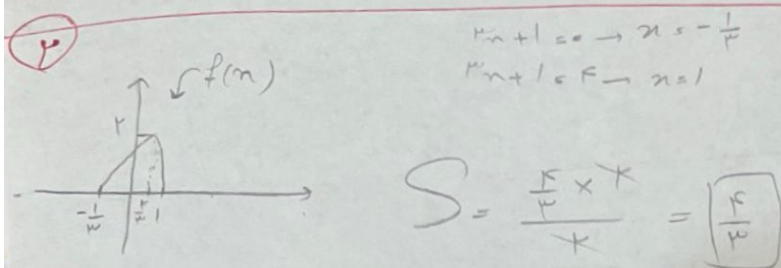
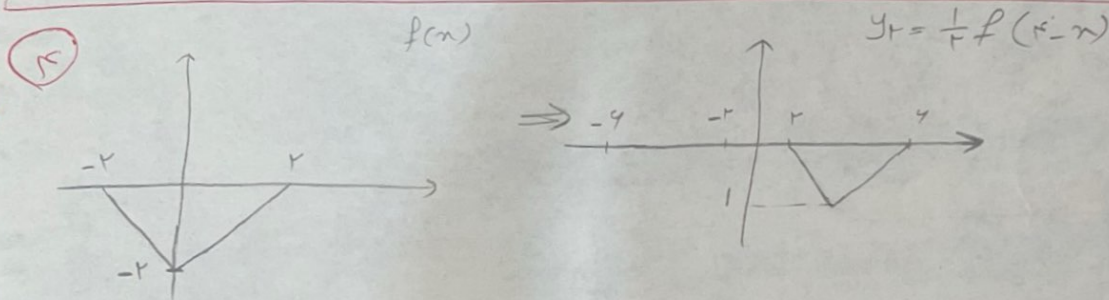


①  $y' = x - 2 + \sqrt{x - 4} \xrightarrow{r} y' = x^2 - 4x + 4 + x - 4$   
 $y' = x^2 - 3x + 0 \xrightarrow{r} y' = (x - \frac{3}{2})^2 - \frac{9}{4} \rightarrow y = \frac{1}{3}x^3 - \frac{3}{2}x^2 + 4x - \frac{9}{4}$   
 در  $x = \frac{3}{2}$   $y = \frac{1}{3}(\frac{3}{2})^3 - \frac{3}{2}(\frac{3}{2})^2 + 4(\frac{3}{2}) - \frac{9}{4} = \frac{1}{3} \cdot \frac{27}{8} - \frac{3}{2} \cdot \frac{9}{4} + 6 - \frac{9}{4} = \frac{9}{8} - \frac{27}{8} + 6 - \frac{9}{4} = \frac{9 - 27 + 48 - 18}{8} = \frac{12}{8} = \frac{3}{2}$   
 $\rightarrow x^2 - 3x = 0 \rightarrow x(x - 3) = 0 \rightarrow x = 0 \rightarrow y = 4$   
 $x = 3 \rightarrow y = 4$



③  $A' = (a + \varepsilon, a - \eta) \xrightarrow{y \in A \cap A'} \varepsilon a + 1 - 1 = a - \eta \rightarrow a = -1 \rightarrow \boxed{a = -1}$



⑤  $-f(x-1)(x+1) \geq 0$

$-1 \quad 0 \quad 1 \quad 2$

$- \quad + \quad - \quad + \quad -$

$D_{f(x)} = [-1, 0] \cup [1, 2]$

⑥  $f(g(x))?$

$1 \rightarrow 3 \rightarrow 4$   
 $3 \rightarrow 4 \rightarrow 2$   
 $2 \rightarrow 4 \rightarrow 1$

$f(g(x)) = \{(1, 2), (2, 1), (3, 4)\}$

پیوست : .....

## (تحت نظارت بانک مرکزی)

✓

$$g \circ f \Rightarrow \{(2, 4), (3, 2)\}$$

$$\left. \begin{array}{l} 1 \rightarrow 2 \rightarrow 4 \\ 3 \rightarrow 1 \rightarrow 2 \\ 4 \rightarrow 3 \rightarrow 1 \end{array} \right\} \begin{array}{l} 1 \rightarrow 2 \rightarrow 4 \\ 2 \rightarrow 4 \rightarrow 3 \\ 3 \rightarrow 1 \rightarrow 2 \end{array}$$

$$f \circ g \Rightarrow \{(1, 4), (4, 3), (2, 1)\}$$

$$\boxed{g \circ f - f \circ g = \{(2, 3)\}}$$

1  $f(-\sin^2 x) = 1 - \sin^2 x = \cos^2 x$

$$-1 \leq -\sin^2 x \leq 0 \\ 0 \leq \cos^2 x \leq 1$$

$$f(\cos^2 x) = 1 - \cos^2 x = \boxed{\sin^2 x}$$

9

$$n=2 \rightarrow 2f(2)=1 \rightarrow f(2)=\frac{1}{2}$$

$$f(n) = \frac{1}{n-2}$$

$$f(f(n)) = \frac{1}{\frac{1}{n-2}-2} = 9n-1 \rightarrow n=0 \rightarrow \boxed{y=-1}$$

10  $f \circ g = 2(n^2 - 4n + 1) - 5 = 2n^2 - 8n + 11$

$$g \circ f = (2n-5)^2 - 3(2n-5) + 1 = 4n^2 - 24n + 21$$

$$4n^2 - 24n + 21 = 2n^2 - 8n + 11$$

$$\begin{array}{l} 4n^2 - 24n + 21 = 0 \\ 2n^2 - 10n + 10 = 0 \end{array} \begin{array}{l} \alpha \\ \beta \end{array} \rightarrow \begin{array}{l} \alpha\beta = \frac{10}{2} \\ \alpha + \beta = 10 \end{array}$$

$$\alpha^2 + \beta^2 = ? \rightarrow (\alpha + \beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta \rightarrow \boxed{\alpha^2 + \beta^2 = 100 - 20 = 80}$$