

۲. آفرین برای نویسنده

الف) $\rightarrow f(x) = \sqrt{\frac{(x-1)^2 - x^2}{x^2 - x}} \rightarrow \frac{1-2x}{x^2 - x} \geq 0 \rightarrow$

$\rightarrow D_f = (-\infty, 0) \cup [\frac{1}{2}, 1)$

ب) $\Rightarrow x \neq -1$ ← به خاطر اینکه منفرجه است
 $\frac{3n+4+n-1}{(x-1)(n+2)} = \frac{4n+3}{(x-1)(n+2)} \neq 0 \Rightarrow x \neq 1, -2, -\frac{3}{2}$

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

الف) $\rightarrow \left(\left(\frac{1}{x}\right)^n - 9\right)(x^2 - x^4) \geq 0 \rightarrow$

$\rightarrow D_f = (-\infty, -2] \cup [1/2, +\infty)$

$\Rightarrow x-1 \geq 0 \Rightarrow x \geq 1$
 $\Rightarrow \sqrt{x-1} - 2 = -\sqrt{y+1} \Rightarrow \sqrt{x-1} - 2 \leq 0 \Rightarrow \sqrt{x-1} \leq 2 \Rightarrow x-1 \leq 4 \Rightarrow x \leq 5$

$\Rightarrow D_f = [1, 5]$

$\rightarrow x^2 - 1 \geq 0 \rightarrow x \geq 1, x \leq -1$

$\rightarrow$ منفرجه است $\rightarrow$ ✓
 منفرجه است $\times$

$\rightarrow x^2 - x - 2 \geq 0 \rightarrow (x-2)(x+1) \geq 0 \rightarrow$

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

$x = -2 \rightarrow f(x) = -3 - 2x - x^2 \rightarrow -x^2 - 2x - 3 \geq 0 \Rightarrow x^2 + 2x + 3 \leq 0 \Rightarrow$

$\Rightarrow f(x) = \sqrt{-x^2 - \frac{1}{2}x + 3}$
 ضرایب: -1 , $-\frac{1}{2}$, 3
 $\Rightarrow \Delta = \left(\frac{1}{2}\right)^2 - 4(-1)(3) = \frac{1}{4} + 12 = \frac{49}{4} \Rightarrow \sqrt{\Delta} = \frac{7}{2}$
 $\Rightarrow x = \frac{-\frac{1}{2} \pm \frac{7}{2}}{-2} = \frac{-1 \pm 7}{-4} \Rightarrow x = 1, -2$

$\rightarrow f(x) - x \geq 0 \rightarrow f(x) \geq x$

$\left\{ \begin{array}{l} x^2 - 2 \geq x \rightarrow x^2 - x - 2 \geq 0 \rightarrow x \geq 2, x \leq -1 \\ x^2 + 3 \geq x \rightarrow x^2 - x + 3 \geq 0 \rightarrow x \in \mathbb{R} \end{array} \right\} \rightarrow D_f = [-2, +\infty)$

$f(\sin 40^\circ + \cos 50^\circ) = f\left(1 + \frac{\sqrt{3}}{2}\right) \Rightarrow f(x) = 2x(x-2) \rightarrow f\left(1 + \frac{\sqrt{3}}{2}\right) = f\left(\frac{2+\sqrt{3}}{2}\right) = 2 + \sqrt{3} \left(\frac{\sqrt{3}-1}{2}\right) =$

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

$$\rightarrow f(a) = \frac{a+1}{a-1} \rightarrow f(f(a)) = f\left(\frac{a+1}{a-1}\right) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a+1}{a-1}} = \frac{2a}{2} = a \Rightarrow a \in \mathbb{R} - \{1\}$$

$$\rightarrow x^2 - 1 = 0 \Rightarrow (x-1)(x+1) = 0 \Rightarrow x = 1 \Rightarrow g(a) = 1 \Rightarrow \sqrt{a^2 - 1} = 1 \Rightarrow a^2 - 1 = 1 \Rightarrow a = \pm \sqrt{2}$$

$$\rightarrow f_{(x+1)} \circ (x-1)(x-2) \Rightarrow f_{(x)} \circ (x-1)(x-2) \Rightarrow f_{(-1)} \times f_{(-1)} = 1 \times 1 = 1$$

$$\rightarrow \cos^2 x + \sin^2 x = 1 \Rightarrow \cos^2 x + \sin^2 x - 1 = 0 \Rightarrow \cos^2 x + \sin^2 x - 1 = 0 \Rightarrow (\cos x + 1)(\cos x - 1) = 0$$