

لیلیا رضایی

۲. آفرین

II if $x < 1 \rightarrow x + 3 \geq x \rightarrow x \geq -3 \rightarrow x < 1$
 $\rightarrow -3 \leq x < 1$ (I) $\cup$ (II) $\rightarrow D_f = [-3, +\infty)$

$\sin \frac{\pi}{4} + \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2} + 1 = \frac{\sqrt{2}+2}{2}$ (6)
 $f(\frac{\sqrt{2}+2}{2}) = 2(\frac{\sqrt{2}+2}{2})^2 - 4\sqrt{2} - f$
 $\rightarrow \frac{2+4\sqrt{2}+4}{2} - 4\sqrt{2} - f = \frac{6+4\sqrt{2}}{2} - 4\sqrt{2} - f = \frac{6-4\sqrt{2}}{2} - f = -\frac{1}{2}$

$f(\frac{a+1}{a-1}) = a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{a+1+a-1}{a+1-a-1} = a$ (V)
 $\rightarrow \frac{2a}{a-2} = a \rightarrow a = 2$ (R - {1})

$f(\sqrt{a-1}) = -f \rightarrow +2-f+ = -f$ (A)
 $\sqrt{a-1} = t \rightarrow +2-f+t = 0 \rightarrow (t-2)^2 = 0$
 $\rightarrow t = 2 \rightarrow \sqrt{a-1} = 2 \rightarrow a-1 = 4 \rightarrow a = 5$

$f(1+3) = f(f) = 1-2+3 = 2$ (9)
 $f(x+3) = f(-3) \rightarrow f(-3) = 3+3+3 = 9$
 $f(-3) \times f(f) = \sqrt{2} \times 2 = 1\sqrt{2}$

$f(f \cos^2 x + 2 \cos x) = f(r, a)$ (1a)
 $f \cos^2 x + 2 \cos x - 3a = 0$
 $\rightarrow \cos x = \frac{-2 \pm \sqrt{4 - 4(-1)(-3a)}}{2} = \frac{-2 \pm 2}{2}$
 $\rightarrow \cos x = 1$ (check)
 $\cos x = 1 \rightarrow x = 0^\circ$
 $\tan x \pm \sqrt{3} \rightarrow \tan^2 x = 3$
 $f(r, a) = 3$

الف) I $x \neq 0$ II $x \neq 1$ III $\frac{x-1}{x} - \frac{x}{x-1} > 0$ (1)

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

ب) $x \neq 1, -2, 0, -1$ (check)
 II $\frac{x}{x-1} + \frac{1}{x+2} = 0 \rightarrow \frac{x(x+2) + (x-1)}{(x-1)(x+2)} = 0$
 $\rightarrow x \neq 1, -2, -\frac{3}{2}$
 $D_f = R - \{1, -2, -\frac{3}{2}\}$

الف) $(\frac{1}{x})^x - 9 > 0 \rightarrow \frac{1}{x^x} > 9$ (2)
 $D_f = R - (-2, 2)$
 ب) $\sqrt{y+1} = 3 - \sqrt{x-1}$ I $x \geq 1$

II $3 - \sqrt{x-1} \geq 0 \rightarrow 3 \geq \sqrt{x-1} \rightarrow 9 \geq x-1 \rightarrow x \leq 10$
 $D_f = [1, 10]$

I: $x^2 - x - 2 > 0 \rightarrow \frac{-1 \pm \sqrt{1+8}}{2} \rightarrow (-\infty, -1) \cup (2, +\infty)$ (3)
 II $\sqrt{x^2-1} + 1 \neq 0$ III $x^2-1 \geq 0 \rightarrow x \leq -1$ or $x \geq 1$
 $I \cap III = D_f = (-\infty, -1) \cup (2, +\infty)$

$f(-2) = 0 \rightarrow 2-2a-f = 0 \rightarrow a = \frac{1}{2}$ (4)
 $f(x) = \sqrt{-x^2 - \frac{1}{4} + 3}$
 $\alpha + b = \frac{1}{2} + \frac{3}{2} = 2 \rightarrow b = \frac{3}{2}$

$f(x) - x \geq 0$ (5) if $x \geq 1 \rightarrow 3x - x - x \geq x$
 $\rightarrow 2x \geq x \rightarrow x \geq 1$