

لیلی رضایی

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)
 $f\left(\frac{\sqrt{2}+2}{2}\right) = 2\left(\frac{\sqrt{2}+2}{2}\right)^2 - 4\sqrt{2} - 4$
 $\rightarrow \frac{2+4\sqrt{2}+4}{2} - 4\sqrt{2} - 4 = \frac{6+4\sqrt{2}}{2} - 4\sqrt{2} - 4 = \frac{6}{2} - 4\sqrt{2} - 4 = -\frac{1}{2}$

$f\left(\frac{a+1}{a-1}\right) = a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{a+1+a-1}{a+1-a-1} = a$ (✓)
 $\rightarrow \frac{2a}{a-2} = a \rightarrow$ هوارد قرار است $(R - \{1\})$

$f(\sqrt{a-1}) = -f \rightarrow +2-f+1 = -f$ (7)
 $\sqrt{a-1} = 1 \rightarrow +2-f+1 = 0 \rightarrow (1-2)^2 = 0$
 $\rightarrow 1 = 2 \rightarrow \sqrt{a-1} = 1 \rightarrow a-1 = 1 \rightarrow a = 2$

$f(1+3) = f(4) = 1-2+3 = 2$ (9)
 $f(x+3) = f(-3) \xrightarrow{x=-6} f(-3) = 2+3+6 = 11$
 $f(-3) \times f(4) = 11 \times 2 = 22$

$f(f \cos^2 x + 2 \cos x) = f(r, d)$ (10)
 $f \cos^2 x + 2 \cos x - 3d = 0$
 $\rightarrow \cos x = \frac{-2 \pm \sqrt{4d - 4(-f)}}{2} = \frac{-2 \pm 2}{2}$
 $\rightarrow \cos x = \frac{1}{f}$ $\hookrightarrow x = \frac{\pi}{2}$ $\hookrightarrow \frac{\pi}{2}$
 $\cos x = \frac{1}{f} \rightarrow x = \frac{\pi}{2}$ $\hookrightarrow \frac{\pi}{2}$
 $\tan x = \sqrt{3} \rightarrow \tan^2 x = 3$
 $f(r, d) = 3$

الف) I $x \neq 0$ II $x \neq 1$ III $\frac{x-1}{x} - \frac{x}{x-1} > 0$ (1)
 $\rightarrow \frac{x^2+1-2x-x^2}{x(x-1)} > 0 \rightarrow \frac{1}{x(x-1)} > 0$
 $D_f = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right)$

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

الف) $\left(\left(\frac{1}{x}\right)^x - 9\right)(x^2 - x^x) \geq 0$ (2)
 $D_f = R - (-2, 2)$

$\hookrightarrow \sqrt{y+1} = 3 - \sqrt{x-1}$ 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 $x^2-1 \geq 0 \rightarrow \frac{-1 \pm 1}{2} \rightarrow (-\infty, -1] \cup [1, +\infty)$
 $I \cap III = D_f = (-\infty, -1) \cup (2, +\infty)$

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

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