

۲۰. آفرینِ عالمی دعا مل نورس

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$\begin{cases} f(x) = (x-1)\sqrt{1-x} \rightarrow 1-x \geq 0 \rightarrow x \leq 1 & D_f = (-\infty, 1] \\ g(x) = -\sqrt{(1-x)^3} \rightarrow (1-x)^3 \geq 0 \rightarrow 1-x \geq 0 \rightarrow x \leq 1 & D_g = (-\infty, 1] \end{cases} \Rightarrow D_f = D_g$ $g(x) = -\sqrt{(1-x)^3} = -\sqrt{(1-x)(1-x)^2} = \sqrt{(1-x)^2} \times \sqrt{1-x} \Rightarrow g(x) = -(1-x)\sqrt{1-x} = (x-1)\sqrt{1-x}$ $1-x = \frac{1-x}{1} \downarrow$ مساوی $g(x) = f(x)$ "دو تابع مساوی اند"	۶
$\begin{cases} f(x) = x\sqrt{x} \rightarrow x \geq 0 & D_f = [0, +\infty) \\ g(x) = \sqrt{x^3} \rightarrow x^3 \geq 0 \rightarrow x \geq 0 & D_g = [0, +\infty) \end{cases} \Rightarrow D_f = D_g$ $g(x) = \sqrt{x^3} \rightarrow g(x) = \sqrt{x^2 \cdot x} = \sqrt{x^2} \times \sqrt{x} \Rightarrow g(x) = x\sqrt{x}$ $x = \frac{x}{1} \downarrow$ مساوی $g(x) = f(x)$ "دو تابع مساوی اند"	۷
$\begin{cases} f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] \rightarrow x \geq 0 & D_f = [0, +\infty) \\ g(x) = \sqrt{x - x } \rightarrow \begin{cases} x \geq 0 \rightarrow x = x \rightarrow x - x = 0 \geq 0 \checkmark \\ x < 0 \rightarrow x = -x \rightarrow x - (-x) = 2x < 0 \times \end{cases} & D_g = [0, +\infty) \end{cases} \Rightarrow D_f = D_g$ $[a - [a]] = 0 \rightarrow \sqrt{x} = a \rightarrow f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] = 0$ $g(x) = \sqrt{x - x } = \sqrt{0} = 0$ $f(x) = g(x)$ "دو تابع مساوی اند"	۸
$P = \{(\underline{1,2})(\underline{2,3})(\underline{3,1})(\underline{0,0})\}, \quad g = \{(\underline{-1,1})(\underline{1,1})(\underline{2,2})(\underline{3,3})(\underline{0,0})(\underline{2,2})(\underline{1,1})(\underline{1,1})\}$ الف) $\left(\frac{f+g}{f-g}\right)(1) = \frac{f_{(1)} + g_{(1)}}{f_{(1)} - g_{(1)}} = \frac{2+1}{2-1} = \frac{3}{1} = 3$ ب) $\left(\frac{f+g}{f-g}\right)(2) = \frac{f_{(2)} + g_{(2)}}{f_{(2)} - g_{(2)}} = \frac{2+3}{2-3} = \frac{5}{-1} = -5$ تقریب سه ج) $f_{(0)} \cdot g_{(1)} = 0 \cdot 1 = 0$	۹
$P(x) = \{(x,1)(-1,x)(0,0)(-x,x)(x,-1)\}$ الف) $g(x) = f(x-1)$ $x-1=2 \rightarrow x=3 \rightarrow x=1 \Rightarrow g_{(1)} = f_{(2)} = 1$ $x-1=-1 \rightarrow x=0 \rightarrow x=0 \Rightarrow g_{(0)} = f_{(-1)} = x$ $x-1=0 \rightarrow x=1 \rightarrow x=\frac{1}{x} \Rightarrow g_{(\frac{1}{x})} = f_{(0)} = 0$ $x-1=x \rightarrow x=-1 \rightarrow x=-\frac{1}{x} \Rightarrow g_{(-\frac{1}{x})} = f_{(x)} = x$ $x-1=x \rightarrow x=x \rightarrow x=\frac{x}{x} \Rightarrow g_{(\frac{x}{x})} = f_{(1)} = -1$ ب) $h(x) = f\left(\frac{1}{x}\right)$ $\frac{1}{x}=2 \rightarrow x=\frac{1}{2} \rightarrow x=-2 \Rightarrow h_{(2)} = f_{(\frac{1}{2})} = 1, h_{(-2)} = f_{(\frac{1}{2})} = 1$ $\frac{1}{x}=0 \rightarrow x=\infty \Rightarrow h_{(0)} = f_{(0)} = 0$ $\frac{1}{x}=x \rightarrow x=\frac{1}{x} \rightarrow x=-x \Rightarrow h_{(x)} = f_{(\frac{1}{x})} = -1, h_{(-x)} = f_{(\frac{1}{x})} = -1$ $h(x) = \{(x,1)(-\frac{1}{x},1)(0,0)(x,-1)(-\frac{1}{x},-1)\}$	۱۰