نام و نام خانوادگی .... پاسخنامه تشریحی تکلیف شماره .... کلاس ....

۱	$\frac{\pi}{4} < 1 \Rightarrow \cot \frac{\pi \frac{2}{3}}{4} = \cot \frac{\pi}{6} = \sqrt{3}$ $\sqrt{3} > 1 \Rightarrow \sqrt{(\sqrt{3})^2+1} = \sqrt{4} = 2$
۲	الف) $g(\frac{\pi}{4}) = 2\cos^2(\frac{\pi}{4}) = 2(\frac{1}{2})^2 = \frac{1}{2}$ $\frac{1}{2} = \frac{1}{x} \Rightarrow x = 2 \Rightarrow \sqrt{\frac{2(2)-1}{2^2}} = \frac{\sqrt{3}}{2}$ ب) $g(\sqrt{2}) \Rightarrow \frac{\sqrt{2}}{1-\sqrt{2}} \times \frac{1+\sqrt{2}}{1+\sqrt{2}} = \frac{\sqrt{2}+2}{1-2} = -\sqrt{2}-2 \Rightarrow f_{(-2-\sqrt{2})} = [-2-\sqrt{2}] = -4$
۳	$f(\frac{\pi}{4}) = \sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}$ $g(\frac{\sqrt{2}}{2}) = \frac{\sqrt{2}}{2}\sqrt{1-(\frac{\sqrt{2}}{2})^2} = \frac{\sqrt{2}}{2}\sqrt{1-\frac{1}{2}} = \frac{\sqrt{2}}{2} \times \sqrt{\frac{1}{2}}$ $\frac{\sqrt{2}}{2} \times \frac{1}{\sqrt{2}} = \frac{1}{2}$
۴	الف) $\{(2,5),(3,5)(6,12)(8,12)\}$ ب) $\varnothing$ ج) $\cancel{\{(2,8)(3,9)(4,10)\}}$ $\varnothing$ د) $\{(4,8)\ (3,6)\ (5,10)\}$
۵	$(2,3) \in \{(1,1),(2,7),(a,3),(b,7)\} \Rightarrow a = 2$ $(2,1) \in \{(3,3),(5,1)\} \Rightarrow b = 5$ $(a,b) = (2,5)$

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۶

$f(f(x)) = a(ax+b)+b = a^2x+ba+b = 4x+3 \Rightarrow a=\pm 2$

اگر $a = +2 \to b(a+1)=3 \to b(3)=3 \to b=1$

$a = -2 \to b(a+1)=3 \to b(-1)=3 \to b=-3$

$f(x)=2x+1$ یا $-2x-3$

$2(-1)+1=-1 \quad -2(-1)-3=-1$

$2x+3=-1$

$2x=-4 \to x=-2 \Rightarrow 2(-2)-3=$

۷

$R_f \in D_g \qquad R_f=[0,\infty) \qquad x^2-4x=x(x-4)=0 \; \begin{smallmatrix}0\\4\end{smallmatrix}$

$D_g=\mathbb{R}-\{0,4\} \qquad + \overset{0}{|} - \overset{4}{|} + \qquad \frac{-b}{2a}=\frac{4}{2}=2 \to \frac{1}{4-8}=-\frac{1}{4}$

$R_g=[-\frac{1}{4},\infty)$

۸

$D_f=[-1,1] \quad D_g=[0,\infty) \qquad D_{f+g}=D_f\cap D_g=[-1,1]\cap[0,\infty)=[0,1]$

~~$R_f=[0,1]$~~ $\to D_{f+g}=[0,1] \to R_f=[0,1] \to D_f=[-1,1] \to D_{(f+g)\circ f}=[-1,1]$

$R_f \in D_{f+g}$

~~$0 \to \sqrt{0}+\sqrt{1-0}=1$~~

~~$1 \to \sqrt{1}+\sqrt{1-1}=1$~~

۹

الف) $t(x-2)=3x+1 \qquad tx-2t=3x+1 \qquad tx-3x=1+2t$

$x(t-3)=1+2t \to x=\frac{1+2t}{t-3} \qquad 4x+5=4(\frac{1+2t}{t-3})+5$

$\frac{4+8t}{t-3}+\frac{5t-15}{t-3}=\frac{13t-11}{t-3} \to \frac{13x-11}{x-3} \Rightarrow f(x)=\frac{13x-11}{x-3}$

ب) $(x+\frac{1}{x})^3=x^3+\frac{1}{x^3}+3(x+\frac{1}{x}) \Rightarrow f(x+\frac{1}{x})=(x+\frac{1}{x})^3-3(x+\frac{1}{x})$

$f(x)=x^3-3x$

۱۰

$e_1=0 \qquad e_{2\sqrt{2}}=0 \qquad R_f=D_g$

$R_f=1 \to x\sqrt{x}=1 \to x=1$

$R_f=2\sqrt{2} \to x\sqrt{x}=2\sqrt{2} \to x=2$

$2-1=1$