Date: / / Sat Sun Man Tue Thu Wed Fri Subject:

۱۹,۷۵

تکلیف شماره ۹ تابش عنبری یازدهم ریاضی

۱ـ

$$f(x)=\begin{cases}\cot\frac{\pi x}{4} & x\leq 1\\ \sqrt{x^2+1} & x>1\end{cases}$$

$f\circ f(\frac{2}{3})=?$

$f(f(\frac{2}{3}))=$

(۲)

$f(\frac{2}{3})=\cot\frac{\pi\frac{2}{3}}{4}\Rightarrow\cot\frac{\pi}{6}=\sqrt{3}$ $\quad f(\sqrt{3})=\sqrt{4}=2$

۲ـ

الف) $f(\frac{1}{x})=\sqrt{\frac{2x-1}{x^2}}$ $\quad g(x)=2\cos^2 x$

$f\circ g(\frac{\pi}{4})=?$

$g(\frac{\pi}{4})=2\cos^2\frac{\pi}{4}=2\times\frac{1}{4}=\frac{1}{2}$

$f(\frac{1}{x})=f(\frac{1}{2})$

$x=2$ $\quad f(2)=\sqrt{\frac{4-1}{4}}=\frac{\sqrt{3}}{2}$

ب) $f(x)=[x]$

$g(x)=\frac{x}{1-x}$

(۲)

$f\circ g(\sqrt{2})=?$

$g(\sqrt{2})=\frac{\sqrt{2}}{1-\sqrt{2}}\times\frac{1+\sqrt{2}}{1+\sqrt{2}}=\frac{\sqrt{2}+2}{-1}$

$f(-\sqrt{2}-2)=[-\sqrt{2}-2]=-4$

۳ـ

$f(x)=\sin x$ $\quad f(\frac{\pi}{4})=\sin\frac{\pi}{4}=\frac{\sqrt{2}}{2}$

(۲)

$g(x)=x\sqrt{1-x^2}$

$g(\frac{\sqrt{2}}{2})=\frac{\sqrt{2}}{2}\sqrt{1-\frac{2}{4}}=\frac{\sqrt{2}}{2}\times\frac{1}{\sqrt{2}}=\frac{1}{2}$

$g\circ f(\frac{\pi}{4})=?$

۴ـ

$f(x)=\{(4,5)\ (9,5)\ (8,12)\ (10,12)\}$

$g(x)=\{(4,9)\ (2,4)\ (9,8)\ (8,10)\}$

(۲)

الف) $f\circ g(x)=\{(4,5)\ (2,5)\ (9,12)\ (8,12)\}$

د) $g\circ g(x)=\{(4,8)\ (2,9)\ (9,10)\}$

ب) $g\circ f(x)=\emptyset$ $\quad$ ج) $f\circ f(x)\ \emptyset$

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۵-

$f=\{(۲,۶)\ (۳,۲)\ (۴,۵)\ (۱,۷)\}$

$g=\{(۱,۲)\ (۶,۱)\ (a,۳)\ (b,۱)\}$

۲

$(۴,۲)\in fog \qquad g(a)=۴ \to f(۴)=۲ \to ۴=۳ \to a=a \to a=۴$

$(۴,۱)\in gof \qquad g(f(a))=۱ \to f(a)=b \to (۴,۵) \to b=۵$

$(a,b)=? \longrightarrow (۴,۵)$

۶-

$fog \to$ ...

$f(x)=۲x+۱ \to g(f(-۱))=-۸$

$f(x)=-۲x-۳ \to g(f(-۱))=-۸$

۲

$f(f(x))=۴x+۳$

$g(۲x+۳)=۳x-۲$

$gof(-۱)=?$

$g(x)=cx+d$

$\frac{۳}{۲}x-\frac{۱۳}{۲}$

$f(f(x))=a(ax+b)+b=a^۲x+ab+b$
$=۴x+۳$

$a^۲=۴$

$a=\pm ۲\begin{cases}a=۲ \to b=۱\\ a=-۲ \to b=-۳\end{cases}$

$g(x)=cx+d \qquad ۲c=۳ \to c=\frac{۳}{۲}$

$g(۲x+۳)=c(۲x+۳)+d=۳x-۲$

$d=-\frac{۱۳}{۲}$

۷-

$f(x)=\sqrt{x+|x|} \qquad f(x)=\begin{cases}\sqrt{۲x} & x>۰\\ ۰ & x\leq ۰\end{cases}$

$g(x)=\frac{۱}{x^۲-۴x}$

۲

$D_f=\mathbb{R}$

$D_{gof}=?$

$\sqrt{x+|x|}\neq ۰ \to x>۰$

$\sqrt{x+|x|}\neq ۴ \to x\neq ۸$

$D_g=\mathbb{R}-\{۰,۴\}$

$\sqrt{x+|x|}\neq \{۰,۴\} \longrightarrow D_{gof}=(۰,+\infty)-\{۸\}$

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$D_{(f+g)\circ f}=[-1,1]$ — 8

1,75

$f(x)=\sqrt{1-x^2}$ $\{x\in D_f \,,\, f(x)\in D_{f+g}\}$

$g(x)=\sqrt{x}$ $\sqrt{1-x^2}\in[0,1] \Rightarrow 0\le\sqrt{1-x^2}\le 1$

$D(f\circ f+g\circ f)=?$ $-1\le x^2\le 0$ $0\le 1-x^2\le 1$

$\hookrightarrow x^2\ge 0$ ✓

D_f: $\frac{-1 \quad +1}{-\ +\ -}$ $D_f=[-1,1]$ $D_{f+g}=D_f\cap D_g=$

$D_g=[0,+\infty)$ $[-1,1]\cap[0,+\infty)\to[0,1]$

سوال ۱) $f\left(\frac{3x+1}{x-2}\right)=4x+5$ $\rightarrow f\left(x+\frac{1}{x}\right)=x^3+\frac{1}{x^3}$ — 9

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$f(x)=?$ $\frac{3x+1}{x-2}=t$ $f(x)=?$ $\left(x+\frac{1}{x}\right)=t$

$f(t)=4\left(\frac{2t+1}{t-3}\right)+5$ $t^3=x^3+\frac{1}{x^3}+3t$

$x=\frac{2t+1}{t-3} \longrightarrow f(x)=\frac{13x-1}{x-3}$ $x^3+\frac{1}{x^3}=t^3-3t$

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

-10

$f(x)=x\sqrt{x}$ $a\geq 0$

$g(f(x))=0$ $g(x)=0$ $x'_2-x'_1=2-1=1$

ریشه $x_1=1$

3

$x_2=2\sqrt{2}$

$f(x)\begin{cases} x_1=1 \rightarrow x\sqrt{x}=1 \Rightarrow x'_1=1 \\ x_2=2\sqrt{2} \rightarrow x\sqrt{x}=2\sqrt{2} \rightarrow x'_2=2 \end{cases}$