P.O.C.A. WONG SIU CHING SECONDARY SCHOOL
PURE MATHEMATICS
CALCULUS : DERIVATIVES
ASSIGNMENT 16B

Date	Name	Grade / Score
		/15

1. Let $f(x)=\begin{cases} x^2\sin\dfrac{1}{x} & \text{if } x\neq 0 \\ 0 & \text{if } x=0 \end{cases}$, $h'(x)=\sin^2(\sin(x+1))$, $k'(x)=f(x+1)$, $h(0)=3$ and $k(0)=0$. Find

(9 marks)

(a) $(f\circ h)'(0)$,

(b) $(k\circ f)'(0)$,

(c) $\alpha'(x^2)$ if $\alpha(x)=h(x^2)$,

(d) $(h^{-1})'(3)$,

(e) $(\beta^{-1})'(3)$ if $\beta(x)=h(x+1)$.

2. Show that $(1+x^2)\frac{dy}{dx}-1=0$ if $y=\tan^{-1}\left(\frac{x-1}{x+1}\right)$. (3 marks)

3. Show that $(1+x^2)\frac{dy}{dx}+xy=1$ if $y=\frac{\ln(x+\sqrt{1+x^2})}{\sqrt{1+x^2}}$. (3 marks)