

國立臺北大學 104 學年度學士班暨進修學士班轉學生招生考試試題

系 別：經濟學系學士班暨進修學士班 2 年級

考試時間：80 分鐘

科 目：微積分

第 1 頁 共 1 頁

可 不可 使用計算機

I. (50 points) Fill in the following blanks.

- Find the tangent line to function $y=3x^2-5x+2$ at $x=2$. Express your answer in the form $y=mx+b$ with slope m and y -intercept b . _____ (1)
- Find the derivative of $(x^2+1)(x^2+3x+2)$, _____ (2); and the derivative of $\frac{x-1}{x+1}$, _____ (3).
- Let function $f(x)=3x^5-5x^3$ has domain $D_1=[-\sqrt{2}, \sqrt{2}]$, then its global maximum is at _____ (4) on D_1 .
Let function $g(x)=3x+5+\frac{75}{x}$ has domain $D_2=[1, 10]$, then its global minimum is at _____ (5) on D_2 .
- Suppose $f(x)=x^3$ and $x=(z-1)(z+1)$. Then $\frac{df}{dz} =$ _____ (6). (Please express it in z).
Suppose $g(x)=\frac{x-1}{x+1}$ and $x=\frac{z+1}{1-z}$. Then $\frac{dg}{dz} =$ _____ (7). (Please express it in z).
- Suppose $f(x)=e^{x^2+3x-2}$. Then $f''(x) =$ _____ (8).
- The value of $\lim_{h \rightarrow 0} \frac{1}{h} \int_2^{2+h} \sin(x^2) dx$ is _____ (9), and the value of $\int_1^2 x \ln x dx$ is _____ (10).

II. (50 points) Fill in the following blanks.

- Find the Taylor series of $\ln(1+x)$ centered at $x=0$, _____ (1).
- Suppose $f(x, y)=4e^{-2(x+y)}$, $0 < x, y < \infty$. We know that $w=x+y$. Then $f(w) =$ _____ (2).
- Let f be an integrable function on $[a, b]$ and $a < d < b$. Suppose $\int_{a+d}^{b+d} f(x-d) dx = 4$ and $\int_{-a}^{-d} f(-x) dx = 7$. Then, $\int_a^b 2f(x) dx =$ _____ (3).
- The value of $\lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{\ln(x+1)} \right)$ is _____ (4).
- The value of $\lim_{h \rightarrow 0} \frac{\int_0^{1+h} e^{t^2} dt - \int_0^1 e^{t^2} dt}{h(3+h^2)}$ is _____ (5).