# 大同大學 106 學年度第 1 學期期中考試試題

科目代號:**G1011** 科目名稱: 微積分 (一) 班級: **XXXX** 座號:　　姓名:
註: 本次考試不可參考自己的書籍、筆記。不可用計算機、電子辭典。

1. Find the limits.

(5%)(a.) $\lim_{x\to 0} \dfrac{\sin^3(3x)}{x^3}$,　　(5%)(b.) $\lim_{x\to 0} \dfrac{x}{\sqrt{4+2x}-\sqrt{4-2x}}$,

2. Find the derivative $y'$ of the followings.

(5%)(a.) $y = 3\sqrt[5]{x} - \dfrac{3x}{\sqrt{x}} + \dfrac{4}{x^2}$,　　(5%)(b.) $y = x^6 e^x \cos x$,

(5%)(c.) $y = (3x^3 - 2x^2 + 4)^{12}$,　　(5%)(d.) $y = \dfrac{x^3 - 6}{x^6 + 3x}$ (use the Quotient Rule),

(5%)(e.) $y = \ln|5x + 6|$,　　(5%)(f.) $y = 2^x + \log_2 x$.

(5%)(g.) $y = \arctan x^2$,　　(5%)(h.) $y = \arcsin \sqrt{x}$.

3. (10%) Find an equation of the tangent line(切線) to the graph of $f(x) = \ln(x^2 + 1)$ when $x = -1$.

4. (10%) Find $k$ such that the line $y = -6x + 4$ is a tangent line of the function $f(x) = k - x^2$.

5. Find $\frac{dy}{dx}$ of the followings.

(10%)(a.) $y = \tan^6 e^{4x}$,

(10%)(b.) $y = x^{2x}$,

(10%)(c.) $e^{xy} - \sqrt{x^2 + y^2} = x^3 + 6$.