

科目名稱: 微積分 系列: 各系
 註: 本次考試不可參考書籍及筆記

不可使用字典

共一頁
 不可使用計算機

1. Evaluate the limits:(每小題8分)

(a) $\lim_{x \rightarrow -3} \frac{x^2 + x - 6}{x + 3}$.

(b) $\lim_{x \rightarrow 0} \frac{\csc(3x)}{\cot(2x)}$.

(c) $\lim_{x \rightarrow 0} \frac{2e^{2x} - 4x - 2 \cos(x)}{x^2}$.

2. Find the derivative (導函數) $\frac{dy}{dx}$ of the followings:(每小題8分)

(a) $y = \sqrt[4]{x^5} - \frac{2}{\sqrt[3]{x}} + \ln(2^5)$.

(b) $y = \sec^3(7x)$.

(c) $y = (5x^3 + 3x^2 + 10)^{101}$.

(d) $y = \frac{e^x + e^{-x}}{e^x - e^{-x}}$.

3. Find an equation of the tangent line(切線) to the graph of

$$f(x) = \ln(x)$$

at the point $(1, 0)$.

(10分)

4. Find the absolute maximum and minimum of

$$f(x) = x^2 - 4 \ln(1 + x)$$

on the interval $[0, 1]$.

(10分)

5. Evaluate the following integrals:(每小題8分)

(a) $\int \frac{x^2 + 2x}{\sqrt[3]{x^3 + 3x^2 + 17}} dx$.

(b) $\int \frac{2x^2 - 12x + 6}{x^3 - 7x + 6} dx$.

(c) $\int_e^\infty \frac{1}{x(\ln(x))^2} dx$.