

大同大學 108 學年度 (暑) 轉學考試 試題

科目名稱: 微積分 系別: 各系
註: 本次考試不可參考書籍及筆記

不可使用字典

不可使用計算機

共一頁

1. Evaluate the limits:(每小題10分)

(a) $\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{x - 3}$.

(b) $\lim_{x \rightarrow -2^-} \left(\frac{x^2 + 4}{x + 2} \right)$.

2. Find the derivatives $\frac{dy}{dx}$ of the following:(每小題10分)

(a) $y = e^x \cos(x)$.

(b) $y = \tan^8(3x^2)$.

(c) $y = \int_x^{10} \tan(t^2 + 1) dt$.

3. Let $f(x) = (4x^2 - 9)^{2/3}$.

(10分)

(a) Determine the open intervals on which $f(x)$ is increasing or decreasing.

(b) Find the relative extrema of $f(x)$.

4. Evaluate the following:(每小題10分)

(a) $\int_0^{\frac{\pi}{2}} \frac{\sin t}{1 + \cos t} dt$

(b) $\int x \ln(x) dx$

(c) $\int_0^1 \int_x^1 e^{y^2} dy dx$.

5. Find a power series (冪級數) for $f(x) = \sin^2(3x)$, centered at 0.

(10分)