

銘傳大學八十九學年度管理科學研究所碩士班招生考試

第三節

微積分 試題

本試卷共 10 題，每題 10 分，滿分為 100 分

1. Let $f(x) = x + 5$ and $g(x) = \sqrt{x}$. Tell whether $g(f(x))$ is continuous when $x = -4$.
2. The side of a cube is measured as 11.4 centimeters with a possible error of ± 0.05 centimeter. Evaluate the volume of the cube and give an estimate for the error in this value.
3. Find the equations of the tangent lines at inflection point of the graph of $y = x^4 - 6x^3 + 12x^2 - 3x + 1$.
4. Find c of the Mean Value Theorem for Integrals for $f(x) = 3x^2$ on $[-4, -1]$.
5. Find the area of the region between the parabola $y^2 = 4x$ and the line $4x - 3y = 4$.
6. If $f(x) = x^{\sin x}$, find $f'(x)$.
7. Derive the reduction formula $\int x^n e^x dx = x^n e^x - n \int x^{n-1} e^x dx$, and use it to find $\int x^3 e^x dx$.
8. Evaluate if possible, the improper integral $\int_0^3 \frac{dx}{(x-1)^{2/3}}$.
9. By differentiating the geometric series $1 / 1+x = 1 - x + x^2 - x^3 + x^4 - \dots, |x| < 1$, Find a power series that represents $1 / (1+x)^2$. What is its interval of convergence?

10. Evaluate the iterated integral $\int_0^1 \int_0^{y^2} 2ye^x dx dy$.

試題完