

國立屏東教育大學 100 學年度研究所碩士班入學考試

微積分 試題

(應用數學系碩士班)

※請注意：答案須寫在答案卷上，否則不予計分。

計算題 (每題 10 分，共 100 分)

1. Find $\lim_{x \rightarrow 1} \frac{x-1}{\sqrt{x}-1}$.

2. Find $\int x^2 \sin x dx$.

3. Find $\lim_{x \rightarrow 0} \frac{\sin x - x}{x^3}$.

4. Find the extreme value for $f(x, y) = 4 + xy - x^2 - y^2$ on $S = \{(x, y) : x^2 + y^2 \leq 1\}$.

5. Find $\int_{-2}^5 \int_0^{3x+2} \int_y 4dz dy dx$.

6. Find d^2y/dx^2 in terms of x and y for the equation $x^2 + y^2 = 25$

7. Find the extrema of $f(x) = 3x^4 - 4x^3$ on the interval $[-1, 2]$.

8. Suppose that the interval of convergence of the series $\sum_{n=0}^{\infty} a_n x^n$ is $(-3, 3)$. What is the radius of convergence of the series $\sum_{n=1}^{\infty} n a_n x^{n-1}$.

9. Let $f(x) = \int_0^{x^2} e^{-u^2} du$, find $f'(x)$.

10. Find the sum of the series $\sum_{n=1}^{\infty} n(1/3)^{n-1}$.