國立屏東教育大學101學年度研究所碩士班入學考試

微積分（B） 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 $\frac{dy}{dx}$ given that $y^3 + y^2 - 5y - x^2 = -4$.

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

3. Find $\lim_{x \to 1^+} (\frac{1}{\ln x} - \frac{1}{x-1})$.

4. Find the volume of the ellipsoid given by $4x^2 + 4y^2 + z^2 = 16$.

5. Find f' if $f(x) = \ln \frac{x^2 + x - 1}{x^2 - 1}$.

6. Find the tangent line to the graph of $x^2 + 4y^2 = 4$ at the point $(\sqrt{2}, -1/\sqrt{2})$.

7. Find the sum of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n}$.

8. Compute the integral $\int \frac{1}{x^2(1+x)} dx$.

9. Evaluate $\int_0^2 \int_y^2 e^{x^2} dxdy$.

10. Find any extrema of the function $f(x, y) = e^{-xy}$ subject to the constraint $x^2 + y^2 \le 1$.