

國立屏東教育大學 103 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 the tangent line of $f(x) = e^{-x} \ln x$ at the point (1,0).
2. Find $\frac{dy}{dx}$ given that $x^2 \sin y + y \cos^2 x = 0$.
3. Find $\int \frac{3}{\sqrt{9-x^2}} dx$.
4. Find the derivative of the function $F(x) = \int_{\pi}^{\ln x} \cos e^s ds$.
5. Find the limit $\lim_{x \rightarrow \infty} x^{\frac{1}{x}}$.
6. $\int x e^{-2x} dx$
7. Find the x -values at $f(x) = \frac{x}{x^2-1}$ which is not continuous. Which of the discontinuities are removable?
8. Find the second derivative of $f(x) = \frac{x^2 + 2x - 1}{x}$.
9. Find each limit, if possible. A. $\lim_{x \rightarrow \infty} (2 - 5e^{-x})$ B. $\lim_{x \rightarrow -\infty} (2 + 5e^x)$
10. Sketch the region bounded by the graphs of the algebraic functions and find the area of the region.
 $y = \frac{1}{2}x^3 + 2, y = x + 1, x = 0, x = 2$