

國立彰化師範大學103學年度碩士班招生考試試題

系所： 統計資訊研究所

科目： 微積分

☆☆請在答案紙上作答☆☆

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每題 20%，共 100%

1. Evaluate $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x}$.

2. Let $f(x) = \begin{cases} x^2 \sin x & , x \neq 0; \\ 0 & , x = 0 \end{cases}$. Prove that f is differentiable at 0.

3. Use differentials to approximate $\sqrt[3]{26}$.

4. Find an equation of the tangent line to the graph $xy = 1$ at the point $(1, 1)$.

5. Assume that $f(x) = \begin{cases} 1 & x \geq 0; \\ -1 & x < 0. \end{cases}$. Let $F(x) = \int_0^x f(t) dt$. Prove that $F(x) = |x|$.