

國立高雄大學 102 學年度研究所碩士班招生考試試題

科目：微積分
考試時間：100 分鐘

系所：
統計學研究所(風險管理組)
本科原始成績：100 分

是否使用計算機：否

- (1) (15%) Find the derivative of $\sqrt{x^{1/2} + \tan x}$.
- (2) (15%) Evaluate the integral $\int_0^\infty x^5 \exp\{-4x^3\} dx$.
- (3) (15%) Evaluate $\lim_{x \rightarrow 0} \frac{\int_0^x v^2 \exp\{2v^2\} dv}{\int_0^x v^2 \exp\{v^2\} dv + \int_0^x v^2 \exp\{2v^2\} dv}$
- (4) (20%) Let the curves C_1 and C_2 are given by $(x, y) = (t, t^2)$ and $(x, y) = (t, t)$, $t \in R$, respectively.
 - (a) Find the two intersections of these two curves;
 - (b) Find the area between these two curves within the two intersections.
- (5) (15%) Apply Taylor series expansion to approximate $\sqrt{17}$ with an error of less than 0.1.
- (6) (20%) Suppose x_1, \dots, x_n be n finite real values. Let a is the value that minimize $\sum_{i=1}^n (x_i - a)^2$; and b is the value that minimize $\sum_{i=1}^n |x_i - a|$. Find a and b in term of x_1, \dots, x_n , respectively.