

東吳大學 105 學年度轉學生(含進修學士班轉學生)招生考試試題

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系級	財務工程與精算數學系三年級	考試時間	100 分鐘
科目	微積分	本科總分	100 分

要有演算過程或寫出理由, 否則扣分.

1. (10%) Find the values of the constants a and b such that

$$\lim_{x \rightarrow 0} \frac{\sqrt[3]{ax + b} - 2}{x} = \frac{5}{12}$$

2. (15%) Find the sum of the series.

$$\sum_{n=1}^{\infty} \frac{1}{n(n+2)}$$

3. (15%) Evaluate the definite integral.

$$\int_0^1 x \tan^{-1} x dx$$

4. (15%) Find an equation for the line through the origin (原點) tangent to the graph of $y = \ln x$.

5. (15%) Evaluate the limit.

$$\lim_{n \rightarrow +\infty} \left(\frac{1}{n+1} + \frac{1}{n+2} + \frac{1}{n+3} + \cdots + \frac{1}{n+n} \right)$$

6. (15%) Evaluate the double integral

$$\iint_R \frac{e^{y-4x}}{y+2x} dA,$$

where R is the region (區域) bounded by

$$y = 4x + 2, y = 4x + 5, y = 3 - 2x \text{ and } y = 1 - 2x.$$

7. (15%) Find the extreme values of $f(x, y) = x^2 + 2y^2$ on the disk $x^2 + y^2 \leq 1$.