

淡江大學九十四學年度轉學生招生考試試題

系別：理工組二年級

科目：微 積 分

准帶項目請打「V」

簡單型計算機

節次：7 月 12 日 第 三 節

本試題共 / 頁

注意：第1題到第11題，可計算於答卷紙上第2頁以後之任何地方或試題紙上，然後將答案寫在答卷上第1頁；答對者各得6分答錯則為0分；第12題到第14題，須寫出計算過程，部份答對可得部份分數。

1. $\frac{d}{dx}(\sqrt{x})^x = ?$

2. $\lim_{x \rightarrow 0^+} x \ln x = ?$

3. If $f(x) = e^{x^2}$, then $\frac{d^3 f(x)}{dx^3} = ?$

4. $\int_0^{\frac{\pi}{4}} \sec x dx = ?$

5. What is the sum of the geometric series $5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \dots$?

6. $\int \frac{2x+1}{2x^2+x-1} dx = ?$

7. What is the directional derivative of the function $f(x, y) = x^2y^3 - 4y$ at the point $(2, -1)$ in the direction of the vector $\vec{V} = 2\vec{i} + 5\vec{j}$?

8. $\int_0^2 \left[\int_x^2 (\sin y^2) dy \right] dx = ?$

9. If E is the solid bounded by $x = 0$, $y = 0$, $z = 0$, and $x + y + z = 1$, what is the volume of E ?

10. Find the area of the region enclosed by $x = 1$ and $x = y^2$.

11. If $u = x^4y + y^2z^3$, where $x = rse^t$, $y = rs^2e^{-t}$, $z = r^2 \sin t$, find the value of $\frac{\partial u}{\partial s}$ when $r = 2$, $s = 1$ and $t = 0$.

12. Find the interval of convergence of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1} x^n}{n}$. (10分)

13. Find the local maximum and minimum values and saddle points of $f(x, y) = x^4 + y^4 - 4xy + 1$. (12分)

14. Find the center of mass of a solid of constant density that is bounded by $x = y^2$, $x = z$, $z = 0$ and $x = 1$. (12分)