

# 淡江大學八十七學年度日間部轉學生入學考試試題

系列：商管組二年級

科目：微積分

本試題共 2 頁

一、填充題：請依順序寫上小題號 (1, 2, ..., 9) 後再寫答案。  
每小格 6 分 共 60 分。

1.  $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x = \underline{\hspace{2cm}}$

2.  $\lim_{x \rightarrow 1^-} \left(\frac{1}{1-x} + \frac{1}{\ln x}\right) = \underline{\hspace{2cm}}$

3.  $\int \frac{\sqrt{1-x^2}}{x} dx = \underline{\hspace{2cm}}$

4.  $\int x^2 2^x dx = \underline{\hspace{2cm}}$

5.  $\int \frac{1}{4x^2-1} dx = \underline{\hspace{2cm}}$

6.  $\int e^x \sin x dx = \underline{\hspace{2cm}}$

7. Find the equation of the line that is tangent to the curve  $x^2 y^3 - 6 = 5y^3 + x$  when  $x = 2$   $\underline{\hspace{2cm}}$

8. If interest  $r$  is compounded  $n$  times a year, find the doubling time  $\underline{\hspace{2cm}}$ . i.e. the time required for an investment to double.

9. Let  $p = D(x) = 15 - \frac{x}{2}$  dollars and  $p = S(x) = \frac{x}{2} + 1$  dollars  
Find the consumer's surplus  $\underline{\hspace{2cm}}$ , and the producer's surplus  $\underline{\hspace{2cm}}$ .

繼續下頁

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二、  
20% Using the first and second derivatives to determine the extrema or points of inflection (10%) of the function  $f(x) = x^4 + 8x^3 + 18x^2 - 8$  and sketch the graph (10%)

三、  
20% Evaluate the double integral  $\iint_R (x+y) dA$  where  $R = \{(x, y) \mid x = y^2, y = x - 2\}$  according to (i)  $dA = dx dy$  (10%), (ii)  $dA = dy dx$  (10%)