

# 淡江大學 99 學年度轉學生招生考試試題

系別：商管組二年級

科目：微 積 分

本試題共 2 大題，2 頁

本試題雙面印刷

## 一. 填充題 (每小題 8 分, 共 80 分)

請按題號作答, 並註明題號.  
只須寫答案, 不必寫出過程.

1. Consider the function  $f(x) = \begin{cases} \frac{x^2-1}{x+1}, & x \leq -1 \\ Ax^2 + x - 3, & x \geq -1 \end{cases}$  Suppose that  $f(x)$  is continuous at  $x = -1$ , then  $A =$  \_\_\_\_\_.

2.  $\lim_{x \rightarrow 1^+} \frac{1 - \sqrt{x}}{x - 1} =$  \_\_\_\_\_.

3.  $\frac{d}{dx} [(x^2 + 1)^5 + e^{-x}]^3 =$  \_\_\_\_\_.

4.  $\int x e^{-3x} dx =$  \_\_\_\_\_.

5.  $\int_0^2 \frac{x^3}{(x^4 + 1)^2} dx =$  \_\_\_\_\_.

6. For  $f(x, y) = x^2 e^y - y^3 \ln x$ , then  $f_{xy}(x, y) =$  \_\_\_\_\_.

7. For the equation  $2x^3 y^6 - 3x^2 + 5y^3 = -1$ , then the slope of the tangent line at the point  $(2, -1) =$  \_\_\_\_\_.

8. For the function  $f(x) = x^3 - 6x^2 + 9x + 8$  on the interval  $[-2, 2]$ , the absolute minimum value is \_\_\_\_\_.

9. The area between two curves  $y = 3x^2 - 3$  and  $y = 2x + 5$  from  $x = -1$  to  $x = 3$  is \_\_\_\_\_.

10. For the function  $\frac{-2x^3 + 1}{7x(x - 1)(x + 2)}$ , the horizontal asymptote is \_\_\_\_\_.

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## 二. 計算題 (每小題 10 分, 共 20 分)

必須詳列計算過程, 否則不予計分

1. A company manufactures two products. The price function for product  $A$  is  $p = 16 - x$ ,  $0 \leq x \leq 16$ , and for product  $B$  is  $q = 19 - \frac{1}{2}y$ ,  $0 \leq y \leq 38$ , both in thousands of dollars, where  $x$  and  $y$  are the amounts of products  $A$  and  $B$ , respectively. If the cost function is  $C(x, y) = 10x + 12y - xy + 6$  thousands of dollars, find the quantities and prices of the two products that maximize profit. Also find the maximum profit.

2. Find the volume under the surface  $f(x, y) = e^{-y}$  over the region which is bounded by curves  $y = x$ ,  $y = 3x$  and  $x = 2$ .