

# 淡江大學 106 學年度進修學士班轉學生招生考試試題

系別：統計學系二年級

科目：微積分

考試日期：7 月 19 日(星期三) 第 2 節

本試題共

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注意事項：(1) 請按題號順序作答，並註明題號；(2) 不可使用計算機；(3) 需要計算過程。

1. (10%) Find the indicated limits if it exists:

a) (5%)  $\lim_{x \rightarrow \infty} \frac{3x + 2}{x - 2}$

b) (5%)  $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$

2. (20 %) Find  $dy/dx$  if

a) (10%)  $y = (3x + 2)^3(2x - 1)^4$

b) (10%)  $y^4 + x^4 - 2x^2y^2 = 9$

3. (20%) Evaluate

a) (10%)  $\int_4^5 \frac{1}{3-x} dx$

b) (10%)  $\int_0^2 xe^x dx$

4. (10%) A farmer estimates that if 80 apple tree are planted per acre, the average yield will be 60 bushels of apples per tree. The average yield will decrease by 2 bushels per tree for each additional tree planted on the same acreage. How many trees should he plant to maximize the total yield?

5. (15%) Find the relative extreme values of  $f(x, y) = e^{x^2 - y^2}$ .

6. (15%) Write the two iterated integrals to find

$$\iint_R 12xy dA,$$

where  $R$  is the plane region bounded by the graphs of  $y = x^2$  and  $y = \sqrt{x}$ . Evaluate one iterated integral.

7. (10%) A rectangular box is measured to be 30 inches long, 24 inches wide, and 10 inches high. If the maximum errors in measuring the length, width, and height of the box are, respectively, 0.3, 0.2, and 0.1 inch, estimate the maximum error in calculating its volume.