

## 淡江大學 98 學年度轉學生招生考試試題

系別：商管組三年級

科目：微 積 分

准帶項目請打「V」	
	計 算 機

本試題共 5 大題， 頁

1. (20%) A company determines that if  $x$  thousand dollars are spend on advertising a certain product, then  $S(x)$  units of the product will be sold, where  $S(x) = -2x^3 + 27x^2 + 132x + 207$ ,  $0 \leq x \leq 17$ . (a) Sketch the graph of  $S(x)$ .  
(b) How much should be spend on advertising to maximize sales? What is the maximum sales level?
2. (20%) Find the indicated integral. (a)  $\int x^2(x^3+1)^{y^4} dx$ ; (b)  $\int \frac{2y^4}{y^5+1} dy$ ;  
(c)  $\int \frac{2x \ln(x^2+1)}{x^2+1} dx$ ; (d)  $\int \frac{e^x + e^{-x}}{e^x - e^{-x}} dx$ ; (e)  $\int \frac{1}{\sqrt{x}(\sqrt{x}+1)} dx$ .
3. (20%) Find all critical points for the function  $f(x, y) = x \ln\left(\frac{y^2}{x}\right) + 3x - xy^2$  and classify each as a relative maximum, a relative minimum, or a saddle point.
4. (20%) Evaluate the double integral over the specified region  $R$ . Choose the order of integration carefully.  
(a)  $\iint_R x^3 e^{xy} dA$ ;  $R: 0 \leq x \leq 1, 0 \leq y \leq 1$  (b)  $\iint_R e^{xy} dA$ ;  $R: \sqrt{y} \leq x \leq 1, 0 \leq y \leq 1$
5. (20%) In the following problems, find the Taylor series for the given function at the indicated point  $x = a$ .  
(a)  $f(x) = \frac{1}{2}(e^x + e^{-x})$ ;  $a = 0$  (b)  $f(x) = \frac{1}{2-x}$ ;  $a = 1$