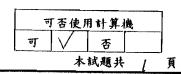
系別:商管組三年級

科目:微 積



- 1. Find the following integrals or limits:(每小題 6 points)

  - (a)  $\int x^4 \ln x \, dx$ . (b)  $\int_0^\infty \frac{x}{(x^2+1)^2} dx$ . (c)  $\int \frac{e^x}{e^x+1} dx$ .
  - (d)  $\int_{0.0}^{2} \int_{0}^{1} (3x^2 + 6xy^2) \, dy dx.$  (e)  $\lim_{x \to 0} \frac{\sqrt{1+x} 1}{x}$ .
- 2. Find  $\frac{dy}{dx}$  or  $\frac{\partial g}{\partial y}$  (每小題 6 points) if
- (a)  $y = e^{3x}$  (b)  $y = \frac{\ln x}{x^5}$  (c)  $y = \int_0^{x^3} 1/(1+\sqrt{t})dt$ , x > 0 (d)  $g(x, y) = \frac{xy}{x^2+y^2}$ .
- 3. Find the maximum and minimum values for the function  $f(x) = x^3 - 3x^2 - 24x + 5$  for x on the interval [-3, 8]. (10points)
- 4. Find the relative extreme values of  $f(x, y) = y^3 + x^3 4xy$ . (10 points)
- 5. Find the Taylor series for  $\int_{0}^{x} \frac{1-e^{t}}{t} dt$  at x=0. (10points).
- 6. A manufacturer of digital clocks determines that he can sell x clocks per week at price p where x and p are related by the equation

$$x^2 + 3xp + p^2 = 4400.$$

This equation determines demand as a function of price, x=Q(p), near the point  $(p_0, x_0) = (40, 20)$ .

- (a) If price is increasing at the rate of 50% per week how fast is demand changing when p=\$40? (8points)
- (b) Find  $\frac{dx}{dp}$  at the point  $(p_0, x_0)$ =(40, 20). (8points)