

科目：微積分

系所組：企業管理系管理學碩士班
乙組

1. (8%) $\lim_{x \rightarrow \infty} \frac{-7x^2 + 4x}{x^2 - 2x} = ?$

2. (10%) $\lim_{x \rightarrow \infty} x^{100} e^{-x} = ?$

3. (8%) Let $f(x) = (1 - 2x^2)^8$. Find $f'(x)$.

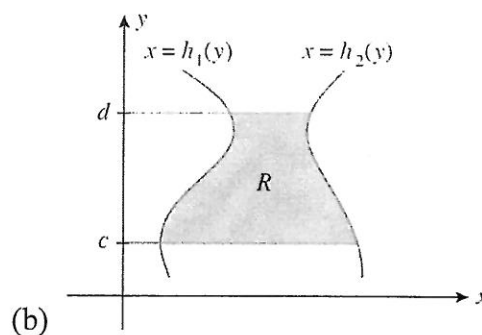
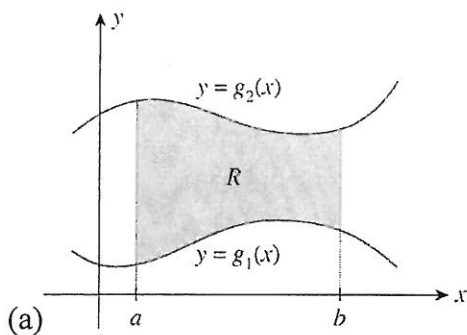
4. (8%) $f(x) = e^{\ln x}$, find $f'(x)$.

5. (10%) $f(x) = x^{\ln x}$, Find $f'(x)$. $\ln y = \ln x \ln x \quad \frac{y'}{y} = \ln x \cdot \frac{1}{x} = \frac{\ln x}{x}$

6. (10%) Find an equation of the tangent line to the function $x^2 y^3 - y^2 + xy + 1 = 0$ at the point $(y, x) = (1, -1)$.

7. (8%) Please write the integral formula to correctly evaluate the following region R .

(Hint: $R = \int_a^b \int_{g_1(x)}^{g_2(x)} dy dx$)



8. (8%) Please evaluate $\int (2x^{-2} + 3x^5) dx$

9. (8%) Please evaluate $\int (e^x + x^e) dx$

10. (10%) Please evaluate $\int \ln x^2 dx$

11. (12%) Please evaluate $\int_{1/2}^1 \frac{3^{x-1}}{x^2} dx$

※ 注意：1. 考生須在「彌封答案卷」上作答。

2. 本試題紙空白部份可當稿紙使用。

3. 考生於作答時可否使用計算機、法典、字典或其他資料或工具，以簡章之規定為準。