

元智大學 107 學年度 轉學考 招生試題卷

系(所)別：化學工程與材料科學學系學士班 組別：化學工程與材料科學學系 2 年級 科目：微積分

用紙第 / 頁共 / 頁

●不可使用電子計算機

1. Find the derivatives of the functions. (20%)

$$f(x) = (5x^2 + 1)(2\sqrt{x} - 1) \quad \text{and} \quad y = \frac{2x^2}{x^2 + x + 1}$$

2. Describe and perform the Chain Rule and use it to find the derivative of $y = e^{\sin x}$ (10%)

3. Obtain the solution of indefinite integrals (20%)

$$\int \frac{\cos x}{1 - \cos^2 x} dx \quad \text{and} \quad \int (x^2 + x - 1)^3 (2x + 1) dx$$

4. Please derive "Growth and Decay" Model (10%)

5. Find f $f''(t) = t^{-3/2}$; $f(4) = 1$, $f'(4) = 3$ by solving the initial value problem. (20%)

6. Prove $\frac{d}{dx}(\cos x) = -\sin x$ (20%)