

考試時間 50 分鐘，試題共有 12 個計算題，前兩題各 5 分，其餘每題 4 分。滿分 50 分。請在考試卷上以中文或英文盡量依序作答，請詳列計算過程，否則不予計分。需標明題號但不必抄題。考試卷務必寫學號、姓名，試題不必繳回。

1. (5 points) Compute  $\frac{d^2y}{dx^2}$  where  $y = \sqrt{x^2 + 3}$ .
2. (5 points) Compute  $\frac{dy}{dx}$  where  $y = \frac{1}{(1-x)\sqrt{2-x}}$ . (化至最簡分式)
3. (4 points) Compute  $\frac{dy}{dx}$  where  $y = xy^2 + 2x^2$ .
4. (4 points) Compute  $\frac{dy}{dx}$  where  $y = \sin(2x) \cos^2 x$ .
5. (4 points) Compute  $\frac{dy}{d\theta}$  where  $y = \tan^3 \theta$ .
6. (4 points) Compute  $\frac{dy}{dx}$  where  $y = \sqrt{x + \sqrt{x}}$ .
7. (4 points) For  $x > 0$ , compute  $\frac{dy}{dx}$  where  $y = x \sin \frac{1}{x}$ .
8. (4 points) Compute  $\frac{dy}{dx}$  where  $\sin(x + y) = x + \cos y$ .
9. (4 points) Compute  $\frac{dy}{dx}$  where  $y = (1 + (x^2 + 2)^5)^3$ .
10. (4 points) Compute  $\frac{du}{d\theta}$  where  $u = \sin(\cos \theta)$ .
11. (4 points) Compute  $\frac{dy}{d\theta} \Big|_{\theta=\frac{\pi}{3}}$  where  $y = \frac{\cos \theta}{1 + \sin \theta}$ .
12. (4 points) Compute  $y'(\frac{\pi}{4})$  where  $y = \theta \tan \theta$ .