

考試注意事項：

1. 答案紙直行對折，兩直欄書寫作答。
2. 無清楚計算過程，不予計分。

試題：

1. (10%) Find  $\int \tan^3 x \sec^7 x dx$ .

2. (10%) Evaluate the integral:  $\int_0^{\pi/2} \sqrt{\cos x} \sin^3 x dx$

3. (10%) Find  $\int \frac{4x^3 + x}{2x^2 + x - 3} dx$ .

4. (10%) Evaluate the integral:  $\int \frac{\sec^2 \theta}{\tan \theta (\tan \theta - 1)} d\theta$ .

5. (5%,10%)

(a) Evaluate  $\lim_{x \rightarrow \infty} \frac{x^3}{e^{2x}}$ .

(b) Evaluate  $\lim_{x \rightarrow 0^+} \left(\frac{1}{x}\right)^{\sin x}$ .

6. (15%) Find  $\int e^x \sin 2x dx$ .

7. (15%) Find  $\int \frac{dx}{\sqrt{x^2 + 4x + 7}}$ .

8. (10%,5%)

(a) Evaluate  $\int_0^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx$ .

(b) Evaluate  $\int_0^1 \frac{\ln x}{\sqrt{x}} dx$ .