

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. (15%) Evaluate $\lim_{x \rightarrow 0^+} x^x$.
2. (15%) Evaluate $\int_0^{\pi/4} \sec^3 x \, dx$.
3. (15%) Find $\int \frac{4x^3 + x}{2x^2 + x - 3} \, dx$.
4. (15%) Evaluate $\int_{-\infty}^0 x e^{-x} \, dx$.
5. (10%) Find the derivative of $f(x) = \cos^{-1} 3x$.
6. (10%) Find the area of the region enclosed by the graphs of

$$y = \frac{1}{4}x^2 \quad \text{and} \quad y = \frac{8}{x^2 + 4}.$$

7. (10%) Evaluate $\int_0^{\pi/2} \sin^3 x \cos^{1/2} x \, dx$.
8. (10%) Find $\int \frac{1}{(4 + x^2)^{3/2}} \, dx$.