

## 微 積 分 期 末 考

第 1 ~ 3 題各 10 分，其餘各題 5 分

1. Find the arc length of the function over the indicated interval.  $y = \ln(\cos x)$ ,  $\left[-\frac{\pi}{3}, \frac{\pi}{3}\right]$
2. Find the area of the region bounded by the graphs of the equations.  $f(x) = xe^{-x^2}$ ,  $y = 0$ ,  $0 \leq x \leq 1$
3. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the  $x$ -axis.  $y = \frac{1}{x}$ ,  $y = 0$ ,  $x = 1$ ,  $x = 3$
4.  $\int (\theta^2 + \sec^2 \theta) d\theta$
5.  $\int \frac{x^4 + 8}{x^3} dx$
6.  $\int_1^4 (3 - |x - 3|) dx$
7.  $\int_0^4 \frac{x}{\sqrt{2x+1}} dx$
8.  $\int \frac{x}{\sqrt[3]{5x^2}} dx$
9.  $\int \sin 2x \cos 2x dx$
10.  $\int_0^{\pi/2} e^{\sin \pi x} \cos \pi x dx$
11.  $\int (\ln x)^3 dx$
12.  $\int \frac{xe^{2x}}{(2x+1)^2} dx$
13.  $\int \sin^3 x \cos^2 x dx$
14.  $\int e^{-3x} \sin 5x dx$
15.  $\int \frac{x^3 + x}{x^2 - 1} dx$
16.  $\int \frac{\sqrt{16-x^2}}{x} dx$
17.  $\int x^3 e^x dx$