Math 181 **Midterm 2** **November 9, 1992**

NAME: (PRINT) ______________________________

SIGNATURE: ______________________________

SSN: ______________________

Show your work clearly and legibly. NO WORK – – NO CREDIT.

1. (20 pts) Sketch the graph of $r = 2 + \sin 2\theta$, and find the slope of this curve at $\theta = \frac{\pi}{4}$ and at $\theta = \frac{\pi}{3}$. [For $\theta = \frac{\pi}{3}$ you should leave $\sqrt{3}$ in your answer. Recall that $\sin\frac{\pi}{3} = \sin\frac{2\pi}{3} = \frac{\sqrt{3}}{2}$ and $\cos\frac{\pi}{3} = -\cos\frac{2\pi}{3} = \frac{1}{2}$ and $\sin\frac{\pi}{4} = \cos\frac{\pi}{4} = \frac{1}{\sqrt{2}}$.]

2. (15 pts) Compute the area inside the cardioid $r = 1 + \cos\theta$.

3. (15 pts) Compute the length of the curve given by $x = 2t^3$, $y = 3t^2$, $0 \leq t \leq 1$.

4. (15 pts) Determine whether the following series converges or diverges, explaining the test you are using. $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{n^4-1}}{2n^3+1}$

5. (15 pts) Write the recurring decimal $0.3518518\dot{5}1\dot{8}\ldots$ as a fraction in its lowest form.

6. (15 pts) Compute $\int_1^3 \sqrt{3+2x-x^2}\;dx$