

# MATH 76

## Test 3

December 6, 2004

Name: \_\_\_\_\_

- No books or calculators are allowed. One page of notes is allowed.
- Please show all your work.
- Please simplify your answers.

1. Find the area of the region enclosed by one loop of the curve  $r = 2 \sin(6\theta)$ .

2. Set up, but do not evaluate, an integral for the length of the curve  $r = 2 \sin(6\theta)$  (whole curve, not just one loop).

3. Find the center and vertices of the ellipse whose equation is  $x^2 - 2x + 4y^2 + 16y - 19 = 0$ .

4. Is the sequence  $a_n = \frac{3n + 2 + \sin(n)}{n + 1}$  convergent? Explain. If convergent, find its limit.

5. For each of the following series, determine whether it is convergent or divergent. Explain your reason (i.e. which test you are using and provide all necessary calculations).

(a)  $\sum_{n=1}^{\infty} e^{-n}$

$$(b) \sum_{n=2}^{\infty} \frac{1}{(\ln n)^n}$$

$$(c) \sum_{n=1}^{\infty} \frac{\arctan n}{n}$$

6. Find the radius and interval of convergence of  $\sum_{n=1}^{\infty} \frac{x^n}{\sqrt{n}}$ .

7. Find the first five terms of the Maclauring series of  $f(x) = \ln(1 + x)$ .

Please do not write anything on this page

Problem	Value	Your score
1	7	
2	4	
3	6	
4	4	
5	15	
6	7	
7	7	
Total	50	

Your total score in this class so far is                      out of                      .

Your current grade is                      .