

Math 126 C - Winter 2006  
Mid-Term Exam Number One  
January 31, 2006

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

Section: \_\_\_\_\_

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
Total	70	

- Complete all questions.
- You may use a scientific, non-graphing calculator during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- If you use a trial-and-error or guess-and-check method, or read a numerical solution from a graph on your calculator, when an algebraic method is available, you will not receive full credit.
- You may use one hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

1. Find the 2nd-degree Taylor polynomial,  $T_2(x)$  for the function  $f(x) = \ln(\ln x)$  based at  $x = e$ .

2. Approximate the integral

$$\int_0^2 \sin(x^2) dx$$

by using the first four non-zero terms of a Taylor series. Given a decimal approximation of your result.

3. Write out the first four terms of the Taylor series for the function

$$f(x) = \frac{1}{1+5x} + \frac{1}{3+x}$$

4. Find the angle between the vectors  $\vec{a} = \langle -3, 4, 1 \rangle$  and  $\vec{b} = \langle 3, 1, 1 \rangle$ . Give a decimal value for the angle.

5. Suppose the vector  $\langle x, 3, 2 \rangle$  is orthogonal to the vector  $\langle 2, 3, x \rangle$ . Find  $x$ .

6. Find the equation of the plane through the three points  $(-3, 4, 0)$ ,  $(1, 7, -3)$  and  $(2, -5, 3)$ .

7. Find the equation of the plane containing the line of intersection of the two planes

$$x + y - z = 3 \quad \text{and} \quad 2x - 3y + 4z = 5$$

and the point  $(-2, 7, 3)$ .