Math 126 C - Spring 2007
Mid-Term Exam Number One
April 19, 2007

Name: _____ Section: _____

1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

- 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.

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1. Let $f(x) = e^x \sin x$.

   (a) Find the second-order Taylor polynomial $T_2(x)$ for $f(x)$ based at $b = 0$.

   (b) Give a bound on the error $|f(x) - T_2(x)|$ for x in the interval $-0.1 \leq x \leq 0.1$.

2. Find the first four non-zero terms of the Taylor series for

$$f(x) = xe^{x^2} - \frac{1}{4+x^2}$$

based at $b = 0$.

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

$$x + y + z + 5 = 0 \text{ and } 3x + 2y - z + 2 = 0$$

and the point $(1, 2, 1)$.

4. Find the point of intersection of the two lines

$$x = 4 - t, y = 6 + 2t, z = -1 + 3t \text{ and } x = 1 + 2t, y = 14 - 8t, z = 7 - 4t.$$

5. Let S be the surface defined as the set of points p (in three-dimensional space) such that the distance from p to the plane $y = 5$ equals the distance from p to the line

$$y = 1, z = 2.$$

(a) Find an equation for S.

(b) Find the equation of the trace of S in the plane $z = 6$. Describe the trace (i.e. what kind of curve is it?).