

Math 126, Section D, Spring 2008, Midterm I

April 24, 2008

Name _____

TA/Section _____

Instructions.

- There are 4 questions. The exam is out of 40 points.
- You are allowed to use one page of notes written only on one side of the sheet in your own handwriting.
- You may use a calculator which does not graph and which is not programmable. Even if you have a calculator, give me exact answers. ($\frac{2\ln 3}{\pi}$ is exact, 0.7 is an approximation for the same number.)
- **Show your work.** If I cannot read or follow your work, I cannot grade it. You may not get full credit for a right answer if your answer is not justified by your work. If you continue at the back of a page, make a note for me. Please BOX your final answer.

Question	points
1	
2	
3	
4	
Total	

1. Let P be the point $(-1, 0, 1)$ and let l be the line $x = 3t, y = 1 + t, z = 2 - t$.

(a) Find the distance from the point P to the line l .(5 points)

(b) Find the equation of the plane containing the point P and the line l .(5 points)

2. Let $f(x) = \ln(1 + x)$.

(a) Find the second Taylor polynomial for $f(x)$ based at $b = 0$. (4 points)

(b) Use your answer in part (a) to estimate $\ln(1.2)$. (2 points)

(c) Find an interval J centered at 0 so that the error upper bound is at most 0.001 in J . (4 points)

3. Write down the Taylor series for the following functions and give the interval for which they converge. Write your answers in sigma notation and write the first 3 nonzero terms explicitly.

(a) $f(x) = \frac{x}{1+3x^2}$ based at $b = 0$. (5 points)

(b) $g(x) = \frac{1}{3x}$ based at $b = 1$. (5 points)

4. Determine if the pairs of planes below are parallel, perpendicular, or neither. If neither, find the angle between them. (10 points)

(a) $2x - 3y + z = 5$ and $x - y - 5z = 4$

(b) $x - y + z = 5$ and $y = x + z$

(c) $x + 4y - 2z = 3$ and $4x - y + z = -1$

(d) $2x + z = 4y$ and $x + y + 2z = 11$