NAME _____ QUIZ SECTION _____

MIDTERM I

Math 126, Section C

October 18, 2006

Problem	Total Points	Score
1	15	
2	15	
3	15	
4	15	
Total	60	

- You may use a scientific calculator and one two-sided sheet of handwritten notes. No other notes, books or calculators are allowed. Please turn off your cell phone.

- Show all your work to get full credit.

- Read instructions for each problem CAREFULLY.

- Leave all your answers in EXACT form.

- Check your work!

1. (15pts) Find the Taylor series for a given function $f(x)$. Give your answer using summation notation.

   (a) $f(x) = e^x$, based at $a = 2$

   (b) $f(x) = \ln(1 - 2x)$, based at $a = 0$.

2. (15pts) Let $f(x) = \frac{1}{(1-x)(1+x)}$.

   (a) Find the Taylor series for $f(x)$ based at $a = 0$, and the interval of convergence. Give your answer using the summation notation.

   (b) Find the 6^{th} Taylor polynomial of $f(x)$ based at $a = 0$. Simplify your answer as much as possible.

   (c) Find $f^{(6)}(0)$.

3. (15pts) Let $f(x) = 2\cos^2 x - 1$.

(a) Find the quadratic approximation $T_2(x)$ of $f(x)$ based at $a = 0$

(b) Use the quadratic approximation to estimate $f(\frac{\pi}{8})$.

(c) Using Taylor's inequality, find the error bound for the estimate you computed in (b).

4. (15pts) Let $A = (3, 0, 0)$, $B = (0, 4, 0)$, and $C = (0, 0, 1)$.

   (a) Find the area of the triangle ABC
   Hint. The following indentity may be useful: $3^2 + 4^2 + 12^2 = 13^2$.

   (b) Let CH be the height of the triangle from the vertex C to the base AB. Find the coordinates of the point H.