Math 118 Fall 2003 ADVANCED PLACEMENT CALCULUS

Quiz **3**

DUE: MON. SEP. 22

Name: _____

Date: _____ **Friday September 19**
Time Begun: _____ Ron Buckmire
Time Ended: _____

Topic covered: The Microscope Equation

The point of this quiz is for you to combine the concepts of the derivative, local linearity, the equation of a tangent line and Euler's Method to be synthesized in something called The Microscope Equation.

Reality Check:

EXPECTED SCORE : _____**/10** ACTUAL SCORE : _____**/10**

Instructions:

1. Once you open the quiz, you have 30 minutes to complete it.
2. You **may not** use the book or any of your class notes, but you may use a calculator. You must work alone.
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one.
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Relax and enjoy....
6. **This quiz is due on Monday, September 22**, at the beginning of class. NO LATE QUIZZES WILL BE ACCEPTED.

Pledge: I, _____, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

Math 118 Fall 2003 Quiz **Three**

SHOW ALL YOUR WORK

Suppose we are stuck somewhere without a calculator and want to approximate the value of sin(3) but all we remember is that $\pi \approx 3.1416$, which is close to 3. We can use information about the $\sin(x)$ function at π to accurately **estimate** the $\sin(x)$ for values *close* to 3.

a. *(4 points.)* What is the derivative of the $f(x) = \sin(x)$ at $x = \pi$?

b. *(3 points.)* Use your answer from **(a.)** to find the equation of the tangent line to the curve $f(x) = \sin(x)$ at the point $x = \pi$.

c. *(1 point.)* If the tangent line goes through the point $(3, y)$, what is the value of y?

d. *(2 points.)* How is the value of y from **(c.)** related to sin(3)? Are they exactly equal in value or merely close in value? **Explain your answer.**

(HINT: You may want to draw a sketch of $\sin(x)$ and its tangent line at $x = \pi$ to help explain your answer.)