

Quiz **3**

DUE: WED. SEP. 25

Name: _____

Date: _____

Time Begun: _____

Time Ended: _____

Monday, September 23, 2

Ron Bucki

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 Wednesday, September 25**, 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.

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.)