Quiz 3

Name: ________________________________

Date: _______________
Time Begun: ________________
Time Ended: ________________

Friday September 19
Ron Buckmire

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.
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 \( \pi \) 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.)