Math 110 Fall 2007

BONUS Quiz **4** — Basic Calculus I

Name: _____

Date: _____
Time Begun: _____
Time Ended: _____

Math 110
Friday, November 30, 2007
Prof. Ron Buckmire

Topic: Euler's Method and Differential Equations

The idea behind this quiz is to assess your understanding of Euler's Method and and Differential Equations.

Reality Check:

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

Instructions:

0. Before you open the quiz, look at the hint at `http://faculty.oxy.edu/ron/math/110/07`
1. Once you open the quiz, **you have 60 minutes to complete it**.
2. You may not use your text or any other source, including course materials. You may use a calculator. You must work alone. Do not discuss the contents of this quiz with anyone.
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 or borrow one. UNSTAPLED PAPERS WILL NOT BE GRADED.
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution.
6. **This bonus quiz is due on Monday, December 3**, 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.

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SHOW ALL YOUR WORK AND EXPLAIN EVERY ANSWER

Consider the initial value problem (IVP) below

$$\begin{aligned} C'(t) &= 2t \cdot (C(t))^2 \\ C(1) &= -1. \end{aligned}$$

(a) *(6 points)* Use Euler's method with a time step of $\Delta t = 1/2$ to fill in the table below.

t	$C(t)$	Δt	$C'(t)$	ΔC
			XXXXXXXX XXXXXXXX XXXXXXXX	XXXXXXXX XXXXXXXX XXXXXXXX

(b) *(2 points)* Consider the function $C(t) = -t^{-2}$. Is this the solution to the given initial value problem?

(c) *(2 points)* Determine whether the approximation computed in part (a) for $C(2)$ is an over-estimate or under-estimate.