BONUS Quiz 1

EXPERIENCED CALCULUS I

Name:	_
	Math 114
Date:	_ Friday, September 9, 2005
Time Begun:	Ron Buckmire
Time Ended:	Angela Gallegos

Topic: Population Model and Euler's Method

This quiz is intended to illustrate your understanding of Euler's Method.

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 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, September 12, 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

- 1. (10 points). Consider the initial value problem P' = kP, P(0) = A. Your goal is to obtain an accurate approximation of P(T), the approximate value of P(t) when t = T > 0.
- **a.** Obtain an approximation for P(T) using Euler's Method with **one** time step. (*Factor your answer!*)
- **b.** Obtain an approximation for P(T) using Euler's Method with two time steps. (Factor your answer!)

c. Show that an approximation for P(T) using Euler's Method with three time steps is $A\left(1+\frac{KT}{3}\right)^3$

d. Write down an expression for P(T) using Euler's Method with N steps. What do you think happens to P(T) as $N \to \infty$?