University of Georgia   **Math 1113**

Department of Mathematics   **Test 2**   Fall 2016

By providing my signature below I acknowledge that this is my work, and I did not get any help from anyone else:

Name (sign): _____   Name (print): _____

Student Number: _____

Instructor's Name: _____   Meeting Time: _____

Problem Number	Points Possible	Points Made
1	20	
2	20	
3	10	
4	10	
5	15	
6	15	
7	10	
Total:	100	

- If you need extra space use the last page.

- Please show your work. **An unjustified answer may receive little or no credit.**

- Your work must be **neat**. If I can't read it (or can't find it), I can't grade it.

- The total number of possible points that is assigned for each problem is shown here. The number of points for each subproblem is shown within the exam.

- Please turn off your mobile phone.

- You are only allowed to use a TI-30 calculator. No other calculators are permitted.

1. Solve each equation below for the value of x.

   (a) [10 pts] $5^{2x+1} = 25^{3x-6}$

   (b) [10 pts] $7^x = 3^{2x+1}$

                                                                        out of a possible 20 points

2. Solve each equation below for the value of x.

    (a) [10 pts] $\log_{10}(2x) = 3$

    (b) [10 pts] $\ln(5x + 1) = 4$

out of a possible 20 points

3. [10 pts] Determine if the function

$$f(x) \;=\; \frac{3}{x-5}$$

   is a one-to-one function. (Justify your conclusions.)

4. [10 pts] A bank account currently has a balance of $20,000. The account pays interest at a rate of 3% per year compounded every three months. The initial deposit was left in the account for 4 years without any withdrawals or other deposits. What was the initial balance? (Round you answer to the nearest cent.)

5. [15 pts] Waste material is placed in a containment area where it decays. The amount of material is an exponential function. It is determined that it takes 21 days for 30% of the material to decay. What is the total time required for 50% of the material to decay?

6. [15 pts] Determine the inverse of the function

$$f(x) = 5e^{2x}.$$

Points earned: _____
out of a possible 15 points

7. Two phenomenon are given below. In each case the situation can be approximated using an exponential function

$$f(t) = Ce^{rt},$$

where C and r are constants. For each situation below state whether r should be positive or negative. Provide a brief (two sentence) justification for your conclusion.

(a) [5 pts] The function is an approximation for the amount of material in a radioactive sample.

(b) [5 pts] The function is an approximation for the population of bacteria with an unlimited food supply.

Points earned: _____
out of a possible 10 points

Extra space for work. If you want us to consider the work on this page you should write your name, instructor and meeting time below.

Name (print): _____ Instructor: Name (print): _____ Time: _____

Points earned: _____
out of a possible 0 points