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: __________________________

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<tr>
<th>Problem Number</th>
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- 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] $7^x = 3^{2x+1}$
2. Solve each equation below for the value of $x$.

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

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

\[ f(x) = 5e^{2x}. \]
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.
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: ______