

Do not write your name on the assignment. Write your name only on the back of this sheet of paper and staple your answers on the front of this sheet of paper. Failure to follow these directions will cost you 1 point on the assignment.

1) (15 points) Suppose you have two ways to finance a used car that costs \$10,000. Option #1, you pay the \$10,000 cash. Option #2, you leave that \$10,000 in the bank at 8% paid annually. You take a car loan of \$10,000 at 10%. If you take a car loan for \$10,000 at 10%. Your monthly payments over the next four years are \$253.63. Let's analyze the two options. With Option #1, you have a car but no money and no loan. With Option #2, you have a car, a loan, and money in the bank. The 48 monthly payments = $48 * 253.63 = \$12,174.24$. With the money in the bank, you will have $\$10,000 * (1.08)^4 = \$13,604.89$. Therefore, by taking the loan at 10% and putting the money in the bank at 8% will make a profit for you of \$1,430.75. What is wrong with the logic? (There are two problems, but you only need to find one.)

2) (20 points each) Illustrate each event on its own supply and demand diagram for buses. Explain your logic.

- A) There is a desire to have more mass transit for environmental reasons.
- B) The price of gasoline goes up.
- C) The price of trucks goes up.

3) (10 points) Suppose the total miles (TM) driven is given by $TM = x + 3x^2 - x^3$, where x is the number of trips taken. Find the functions for average miles (AM) driven and marginal miles (MM) driven. Show all work.

4) (15 points) Prove that the marginal of any function will cross the average of that function at the maxima and minima of the average function.