Please show all work.

1. Consider the function 

a) Determine the critical points. (Apply the quotient rule carefully to find derivative.)

b) For what intervals in the domain of *f* is the function increasing?

c) For what intervals in the domain of *f* is the function decreasing?

2. Find all maximum and minimum values of the function .

3. The daily cost to manufacture generic trinkets for gullible tourists is given by the cost function:

dollars

a) Determine the marginal cost function.

4. Determine the derivatives of the following functions:

a) 

b) 

c) 

d) 

5. The cost of controlling emissions at a firm rises rapidly as the amount of emissions reduced increases. Here is one possible model:



Where *q* is the reduction in emissions (in pounds of pollutant per day) and *C* is the daily cost to the firm in dollars of this reduction. Government clean-air subsidies amount ot $500 per pound of pollutanat removed. How many pounds of pollutant should the firm remove each day in order to minimize the net cost (cost – subsidy)?

6. Suppose that during a prolonged recession, property values depreciated 2% every six months. If a house originally cost $180000, determine its value at the end of five years.

7. Suppose you want to be earning an annual salary of $80000 in 10 years. You have been offered a job with a guaranteed 5% increase in salary per year. The initial salary is negotiable. What initial salary should you request to meet your goal of $80k in 10 years?