Wilf Csaplar Jr. Business 205 Homework #5 **Due Thursday 3/6**

Place your name on the back of this sheet of paper and nowhere else. Staple your answers face up on the front of this sheet of paper. Failure to follow these directions will cost you 1 point. If you use double-sided printing or print on the back of scrap paper, I will give you one additional point.

Show all work for all questions.

1) (20 points) Find the local maxima and local minima for the function $F(X) = 2X^3 + 21X^2 + 60X + 30$. Use the second order conditions to determine whether they are maxima or minima. State how you found the answer.

2) (10 points) Suppose the total revenue function is given by TR = F(Q) and the total cost function is given by G(Q). Find the profit function and use that to prove that the profit maximizing output is where MR = MC.

3) (20 points) Suppose the total cost function is given by $TC(Q) = Q^2 + 10Q + 5$ and the inverse demand function is given by $P(Q) = 40 - \frac{1}{2}Q$. Find the total revenue function and the profit maximizing output. Use the second derivative test to prove that profits are actually maximized not minimized.

4) (30 points) Suppose the inverse demand for a book is $P(Q) = 10 - \frac{1}{4}Q$. The cost function is given by $TC(Q) = .3Q^2 + Q + 1$. The royalties are Y(Q) = .2*TR(Q). Find the profit function as a function of Q. Find the profit maximizing Q. Find the royalty function as a function of Q. Find the royalty maximizing quantity. Is the book correct that authors want a lower price and higher quantity than the publisher? What is the economic reason for this?

5) (20 points) Use the generic inverse demand function P=P(Q). Find total revenue as a function of Q and use that to find marginal revenue as a function of Q. Rewrite that equation to have MR as a function of P and the elasticity of demand. Prove that you never want to produce in the inelastic part of the demand curve.