Wilf Csaplar Jr.　　　　　ECON/BUSI 205　　　　Homework #4　　　　**Due Tuesday 3/1**

Place your name on the back of this sheet of paper and nowhere else. Staple your answers 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 calculations and all work on all questions.

1) (15 points each) For each of these functions, determine if it is strictly concave, concave, strictly convex, convex or none of the above using the second derivative test. Explain how you reached your conclusion.
A) $MC(Q) = Q^2 - 40Q + 500$.
B) $TR(Q) = -Q^2 + 30Q + 75$.
C) $TC(Q) = (⅓)Q^3 - 20Q^2 + 500Q + 20$

2) (20 points) Suppose an author makes royalties of 2% of the revenue. The inverse demand curve for the book is $Q(P) = 500 - 2P$. The total cost function is given by $TC(Q) = 10Q + 30$. Find the price and quantity which the book company would want to charge and publish. Find the price and quantity which the author would want to charge and sell. Why aren't they the same?

3) (20 points) Find all stationary points for $F(X) = (¼)X^4 + (⅓)X^3 - 8.5X^2 - 15X + 30$. (Hint: After setting the derivative $= 0$, you may want to factor the equation.)

4) (15 points) The total revenue is given by $TR(Q) = P(Q)*Q$ and elasticity is $\varepsilon = \dfrac{P}{Q} * \dfrac{dQ}{dP}$

Find marginal revenue and prove that $MR = P*\left(1 + \dfrac{1}{\varepsilon}\right)$