Wilf Csaplar Jr. Business 205 Homework #10 **Due Friday 11/30**

The last one!

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.

1) (15 points each) For each of the following, determine if it is concave, convex, or indeterminate. State how you reached the conclusion.
A) $Q(K, L) = 12K^{1/3}L^{1/4}$ for $K, L \geq 0$.
B) $F(X, Y) = X^2 + 2XY + Y^2$
C) $F(X, Y) = X^2 - 2XY + Y^2$

2) (20 points) Prove that if $Y = F(X_1, X_2, \ldots X_n)$ is additively separate, then it is convex if and only if $F_{ii}'' \geq 0$ for all i.

3) (15 points) Prove that if $Y = F(X_1, X_2, \ldots X_n)$ is additively separate, then it is strictly concave if $F_{ii}'' < 0$ for all i.

4) (15 points) Prove that if $Y = F(X_1, X_2, \ldots X_n)$ is convex, then if $F_{ii}'' \geq 0$ for all i.

5) (5 points) Why does it make sense that indifference curves are concave?