Wilf Csaplar Jr. Business 205 Homework #10 **Due Thursday 4/24**

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 for all questions.**

There are two things your book does, which are non-standard. Every time you take a derivative you need to add '. So a second derivative is ", etc. The book leaves off the "primes," "double primes," etc. Also, the Hessian is $\nabla^2$ not $\nabla_2$.

1) (5 points each) Suppose that $F(X, Y) = 4X^{1/2}Y^{1/2} + 3X^2 + Y^3$. Find each of the following.
A) $\partial F/\partial X$
B) $F_2$"
C) $\partial^2 F/\partial X^2$
D) $F_{YY}$"
E) $\frac{\partial^2 F}{\partial X \partial Y}$

2) (15 points) Suppose the production function is given by $Q = 6K^{1/3}L^{1/2}$. Find the MPK and MPL. Prove that the MPK and MPL are both downward sloping. How does the MPL change if capital increases? For each part, briefly state what you did.

3) (15 points) Suppose a utility function of flowers (F) and hats (H) was given by the CES utility function $U(F, H) = 5[0.4F^{-.5} + 0.6H^{-.5}]^{-2}$. Find the slope of the indifference curve with hats on the horizontal axis. (Remember the slope = $-MRS_{XY}$.)

4) (30 points) Suppose a Cobb-Douglas utility function of apples (A), bananas (B), and carrots (C), is given by $U(A, B, C) = 48A^{1/3}B^{1/4}C^{1/4}$. Find $\nabla U$ and $\nabla^2 U$. Show all work.

5) (15 points) Suppose that your utility of eggs (E), and rabbits (R) at time t is given by: $U(E(t), R(t)) = 8E^{1/2}R^{1/4}$, where $E(t) = 3 + \frac{1}{2}t$ and $R(t) = t^{1/2}$. Find dU/dt.