Wilfrid W. Csaplar Jr., Ph.D. Economics 477 Exam #1 2007/10/02

Write your name on the cover of the test booklet and nowhere else. Failure to follow these directions will cost you 1 point. The test has 150 points (to be scaled up to 250 points) and is scheduled to take 75 minutes. Therefore, expect to spend 1 minute for every 2 points. For example, a 16-point question should take 8 minutes. I cannot give extra time because most of you have a class after this one.

Show all work on all questions.

1) (8 points) Do EITHER Part A OR Part B.
A) What is the economic reason why must utility functions have *decreasing returns to scale*?
B) What is the inter-temporal budget constraint for consumption and income over a three year period? Briefly explain how you got that formula.

2) (10 points) Do EITHER Part A OR Part B.
A) Is $U(X, Y, Z) = 3X^{4/3}Y^{-1}Z^{1/3}$ a legitimate utility function? Explain your logic. If it fails a test, you only need to show that failed test.
B) If $F(X, Y) = 4X^{-1}Y^{2}$, then find F_X', F_{XX}", and F_{XY}".

3) (24 points) Find all Nash equilibria in the following matrix. Prove that you found all and prove they are Nash equilibria. Find the cooperative solution. Explain how you found it. Find both player's safe (secure) strategy. Explain how you found it.

Payoff Matrix		Browns		
		Expensive Tickets	Medium Priced	Cheap Tickets
Steelers	Expensive Tickets	112 99	93 106	109 136
	Cheap Tickets	-7 97	111 113	92 93

4) (30 points) Suppose that both firms are facing the following demand and total cost functions: $P = 68 - 4(Q_1 + Q_2)$ and $TC_i = 10 + 3Q_i + ½(Q_i^2)$. Use this to derive the best response function for Firm 1 and the equilibrium output for each firm, assuming that the firms are Cournot style firms. What are the outputs and profits of the two firms and the market price? Show all work.

5) (36 points) Suppose your utility function is given by $U = 16B^{1/4}G^{1/2}$. The price of bananas is \$2/lb and the price of grapes is \$1/lb. Find your utility maximizing level of consumption of bananas and grapes if your income is \$96. **What is the value of λ?** Approximately, how much would your utility increase if your income went up to \$98?

6) (42 points) Suppose that labor costs \$1/unit and capital costs \$2/unit and the firm's production function is given by $Q = 8K^{1/2}L^{1/4}$. Derive formulas for the total cost for an output of Q. DO NOT calculate the value of λ. Use that to find the marginal cost and average total cost functions. Show all work.