## Economics 311 Midterm Exam

John Kennan, October 21, 2014

Time allowed: 75 minutes

**IMPORTANT**: Explain your answers carefully. A good diagram is often more effective than a lot of words (but you must explain what the diagram means). You get no credit for unsupported assertions or guesses. Write as if you are trying to convince an intelligent person who does not already know the answers. If your answers would not convince such a person, it will be assumed that you do not fully understand the answers.

1. Five people go to dinner at a restaurant. They all have the same preferences, over food, f, and other stuff, y, represented by the utility function

$$u\left(f,y\right) = fy$$

They all have the same amount of money to spend, I. The price of food is p (relative to other stuff).

- (a) Suppose each person orders independently, and each person pays an equal share of the total cost of the meal. Find a Nash equilibrium of this game (where each person's strategy is the cost of the food that this person orders).
- (b) Compare the Nash equilibrium outcome with the outcome when each person pays separately for their own meal.
- 2. An expected utility maximizer with constant relative risk aversion and wealth w buys  $\alpha$  units of insurance at price q against a loss D that occurs with probability  $\pi$ , where  $q \ge \pi$ . Find  $\alpha$ .
- 3. Say whether the following assertions are true, false or uncertain, and explain why.

[Hints: (1) most true-false questions are false; (2) this exam was written by someone who knows (1)].

- (a) A firm uses 10 units of labor and 20 units of capital to produce 10 units of output. The marginal product of labor is 0.5. If there are constant returns to scale the marginal product of capital must be 0.25.
- (b) A movie theater which sets admission prices in such a way that many seats remain empty cannot be maximizing profits.