LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

Microeconomics

January 16, 2015

Group 1

1. Consider a consumer whose utility function is $u(x_1, x_2) = \ln (x_1 + 2 x_2)$.

a) (0.5 marks) Formulate the consumer choice problem.
b) (2 marks) Find this consumer's demand.
c) (0.5 marks) Determine the indirect utility function.
d) (1 mark) Determine the expenditure function.

2. (1 mark) Let the "at least as good as relation" be a preference relation (a binary relation satisfying completeness and transitivity). Show that the "strict preference relation" is transitive.

Group 2

Filipe plays soccer with a second league team. If he does not suffer any injury by the end of the season, he will get a professional contract with his team, which is worth 10000 euros. If he is injured, he will get a contract as a fitness trainer, which is only worth 100 euros. The probability of suffering an injury is 10%. He is likely to get through the season unscathed with a 90% probability. Assume that Filipe's von Neuman-Morgenstern utility function is $u(x) = \sqrt{x}$.

a) (0.5 marks) How high is the expected value of this gamble?
b) (0.5 marks) Is Filipe risk averse, risk neutral, or risk lover?
c) (1 mark) How high is the expected utility of the gamble described above?
d) (1.5 marks) Assuming that Filipe could buy insurance at price p that would pay him 9900 euro in the case of an accident, how high could the maximal value of p be for Filipe to still afford the insurance?
e) (1.5 marks) How high is the certainty equivalent for the above gamble? How high is the risk premium?

Group 3

1. Let $f(x)=10x-x^2/2$. Determine:

a) (1.5 marks) the input demand function;
b) (1 mark) the output supply function;
c) (1 mark) the profit function.

2. (1.5 marks) Prove that if the production function $f(x_1,x_2)$ is homogeneous of degree 1, it can be written as: $f(x_1,x_2) = MP_1(x_1)x_1 + MP_2(x_2)x_2$, where $MP_i(x_i)$ is the marginal product of input i.

Group 4

1. In a perfectly competitive market there are J firms. Each firm produces output q according to an identical cost function $c(q) = k + q^2$, where $k > 0$. Market demand is given by $Q_d = a - p$. Assume $a > 2\sqrt{k}$.

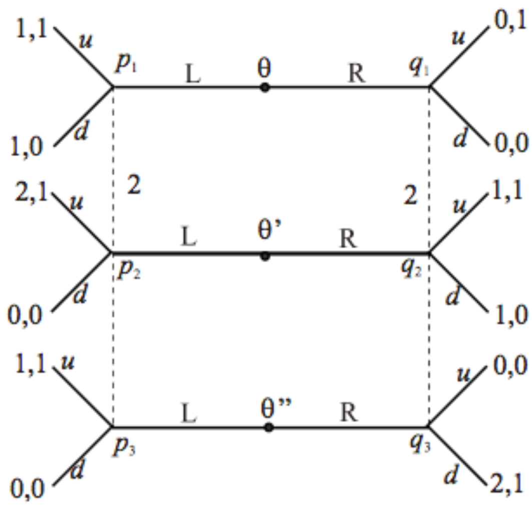
a) (1.5 marks) Determine the profit-maximizing output of an individual firm.
b) (1 mark) Determine the market price and amount produced by all firms in the short-run.
c) (1 mark) Compute the number of firms that are active in this market in the long-run equilibrium (ignoring any integer constraints).

2. Consider a consumer whose income is y_0 and consider an inferior (but not Giffen) good q, whose price falls from p_0 to p_1 (i.e., $p_0 > p_1$).

a) (0.5 marks) Define compensating variation (CV).
b) (1 mark) Graphically represent the CV in the space (q, p).

Group 5

1. (5 marks) The game below starts with a move by Nature (not represented in the tree), who chooses player 1's type. Player 1 can be of type θ, θ' or θ'', each type has equal probability of occurring. Player 1 observes his type, but player 2 only knows the *a priori* probability of each type. However, player 2 observes the action chosen by player 1 (L or R).



Check whether there is a weak perfect Bayesian equilibrium in which all types of player 1 choose L. Specify the profile of equilibrium strategies, as well as the equilibrium beliefs.

Group 6

1. Consider the market for used cars, where cars are transferred from one person to another after a period of use and the car's inevitable wear and tear. Assume that the quality of a car is given by θ, which follows a uniform distribution in [0, 1], where 0 is the lowest possible quality level and 1 is the highest quality level. Assume that both buyers and sellers are risk neutral and let v_s and v_b be the valuation of a car of quality 1, for buyers and sellers, respectively.

a) (2 marks) Assume that both sides of the market observe θ. Under which conditions is the seller of a car of quality θ willing to sell his car? Under which conditions is a buyer willing to buy a car of quality θ? Which values can the price of such a car take?

b) (2 marks) Now suppose that only the seller can observe quality, while a buyer knows the distribution of θ. Under which conditions is the seller of a car of quality θ willing to sell his car? Under which conditions is a buyer willing to buy a car of quality θ?

2. (1 mark) Explain (i) the meaning and (ii) the importance of the "single-crossing property" of indifference curves in signaling models.