EC202 Hand-in Work

2016-17

Guidelines

- In weeks 2, 3, 5, 7, 9, 11 there are assignments for you to hand in.
- These are not optional: they form part of your formative coursework. Grades will be recorded by your class teacher.
- The hand-ins are to be *your own work* only: don't prepare them with classmates or friends.
- Make sure you get the work in to your class teacher on time.

EC202, 2016-17. Hand-in work, week 2

Let z_1, z_2 denote quantities of two inputs with prices w_1, w_2, and let q denote output. Assume that a firm's production possibilities are given by

$$\log q \leq 0.25 \log (z_1 - A) + 0.25 \log (z_2), \text{ if } z_1 > A, z_2 > 0$$

(where $A \geq 0$) and that otherwise the firm's output is zero.

1. If $A = 0$ does production exhibit increasing, constant or decreasing returns to scale?

2. Find the cost function for any $A \geq 0$.

3. Draw the average and marginal cost curves for the case $A > 0$ and for the case $A = 0$.

EC202, 2016-17. Hand-in work, week 3

A competitive firm produces a single good using four inputs according to the production constraint

$$\log q \leq \alpha_1 \log(z_1) + \alpha_2 \log(z_2) + \alpha_3 \log(z_3) + \alpha_4 \log(z_4)$$

where q is output z_i is its usage of input i and $\alpha_i > 0$ is a parameter $i = 1, ..., 4$.

1. Find the long-run marginal cost function for this firm. Under what conditions will it rise with output?

2. Assume that in the short run input 4 is fixed: find the short-run marginal cost function.

3. Assume that in the short run both inputs 3 and 4 are fixed: find the short-run marginal cost function.

4. Find the firm's short-run elasticity of supply for the two interpretations of "short-run".

EC202, 2016-17. Hand-in work, week 5

A person's preferences are given by

$$U(x_1, x_2) = [x_1 - \beta_1]^{\alpha} [x_2 - \beta_2]^{1-\alpha}$$

where x_1, x_2 are quantities of two goods and $\alpha \in (0,1), \beta_1 \geq 0, \beta_2 \geq 0$ are parameters.

1. Find the indirect utility function.
2. Suppose that for this person $\beta_1 = \beta_2 = 0$. The government introduces a subsidy on good 1 that reduces its price to ninety percent of its former value. Using the indirect utility function, show by what proportion the person's consumption of good 1 is increased.
3. Take the situation described in question 2. If the government wants to adjust the person's income so as to ensure that he/she is no better off than before the subsidy was introduced, in which direction would income need to be adjusted and by what proportion would income need to be adjusted?

EC202, 2016-17. Hand-in work, week 7

In a two-commodity private-ownership exchange economy there are two types of person: a-type persons are endowed with resources (R_1^a, R_2^a) and b-types are endowed with resources $\left(R_1^b, R_2^b\right)$.

1. Assuming that there is a competitive allocation, explain how the incomes y^a, y^b of each type of person are determined.

2. Suppose the two types have indirect utility functions given by

$$\frac{y^a - p_1\alpha_1 - p_2\alpha_2}{\sqrt{p_1 p_2}} \quad , \quad \frac{y^b - p_1\beta_1 - p_2\beta_2}{\sqrt{p_1 p_2}},$$

   where the αs and βs are non-negative parameters and p_1, p_2 are prices of the two goods. Find type h's demand for good i, $h = a, b$, $i = 1, 2$.

3. Assume that there are equal numbers of the two types. If there is a competitive equilibrium, find the equilibrium price ratio as a function of the property distribution [$\mathbf{R}$] and comment on the result.

EC202, 2016-17. Hand-in work, week 9

Suppose I have to pay £2 for a ticket to enter a competition. The prize is £19 and the probability of winning is $\frac{1}{3}$. I have an expected utility function with $u(x) = \log x$ and my current wealth is £10.

1. Am I risk averse?
2. What is the certainty equivalent of this competition?
3. What is the risk premium?
4. Should I enter the competition?
5. Consider another situation where the ticket price is £4, the prize is £38 and my current wealth is £20 (the probability of winning and my utility function remain unchanged). Explain how you can find the answer to questions 2 to 4 in this new situation without writing down any mathematical expressions at all.

EC202, 2016-17. Hand-in work, week 11

1. In a two-good economy there is a resource stock of one unit of good 2, but none of good 1; good 1 can be produced from good 2 as follows

$$q = \begin{cases} z - k & \text{if } z > k \\ 0 & \text{otherwise} \end{cases},$$

where q is the amount of good 1 produced as output, z is the amount of good 2 used as input, and $0 < k < 1$. Draw the attainable set of this economy.

2. Consumers are identical and the preferences of a representative consumer are given by

$$-e^{b-x_1} + x_2$$

where x_i is consumption of good i and the parameter b satisfies $0 < b < 1 - k$. Draw the the indifference curves for a given value of b.

3. Explain what conditions must be satisfied for an allocation with positive amounts of both goods to be Pareto efficient.

4. Show that, if b also satisfies the condition $e^b - b > k + 1$, then $(b, 1 - k - b)$ is a Pareto-efficient allocation.

5. Could this efficient allocation be supported by a competitive equilibrium?

6. Suppose instead that good 1 were to be provided by a private monopoly. Explain why this might lead to a Pareto-inefficient outcome.