

Micro II Midterm, October 15, 2007

You have until 2:50 to complete this exam. Answer all four questions. You may use results covered in class, the textbook, or your homework to answer the questions. To insure maximum credit, be sure to explain your answers. Each question is worth 25 points, for a total of 100 points. The problems are not equally hard. Good luck!

1. There are two consumers and two goods. The indirect utility functions of the consumers are $v_1(\mathbf{p}, m) = (p_1 + m)/(p_1 + p_2)$ and $v_2(\mathbf{p}, m) = (p_2 + m)/(p_1 + p_2)$. If these are the only consumers, is market demand a function of prices and aggregate income? Or does the income distribution affect market demand? Explain.
2. A firm using two inputs has production function $f(\mathbf{z}) = (z_1 z_2)^{1/3}$. Factor prices are $\mathbf{w} = (w_1, w_2) \gg \mathbf{0}$.
 - a) Suppose the inputs are goods 1 and 2 and the output is good 3. Find the production set $Y \subset \mathbb{R}^3$.
 - b) Given q , find the conditional factor demands.
 - c) Compute the cost function.
3. Suppose utility has the additive separable form $U(\mathbf{x}) = u_1(x_1) + u_2(x_2) + u_3(x_3)$ where the u_ℓ are twice continuously differentiable on \mathbb{R}_+ with $u'_\ell > 0$ and $u''_\ell < 0$. Moreover, $\lim_{x \rightarrow 0} u'_\ell(x) = +\infty$ for $\ell = 1, 2, 3$. Consider the consumer's utility maximization problem given income $m > 0$ and prices $\mathbf{p} \gg \mathbf{0}$.
 - a) Find the first-order conditions and show that there are no corner solutions.
 - b) Eliminate the remaining multiplier from the first-order conditions. Then show that $\partial x_\ell / \partial m$ has the same sign for all ℓ .
 - c) Now show that all goods are normal.
4. Suppose the indirect utility is

$$v(\mathbf{p}, m) = \begin{cases} \ln \frac{m}{p_2} & \text{if } p_1 \geq m \\ \frac{m-p_1}{p_1} + \ln \frac{p_1}{p_2} & \text{if } p_1 \leq m \end{cases}$$

- a) Compute the expenditure function.
- b) Compute the Hicksian demand function.