

ECON 6090 - TA Section 3

Feiyu Wang & Yuxuan Ma

September 20, 2024

Exercises

Preference and Utility Representation

1. (2014 Prelim 1) A consumer has preference on \mathbb{R}_+^2 which can be represented by the utility function $u = x^3 y^2$. Is u concave? Is it quasi concave? Is there a concave utility function representing the consumer's preferences?

Optimization and Comparative Statics

2. (2007 Prelim 1) There are two goods, $x = (x_1, x_2) \in \mathbb{R}_+^2$. A consumer has the utility function $U(x) = u_1(x_1) + u_2(x_2)$ where each u_i is twice continuously differentiable with $u_i'(x_i) > 0$ and $u_i''(x_i) < 0$ for all $x_i \in \mathbb{R}_+^1$. Each u_i also satisfies the condition: $\lim_{x_i \rightarrow 0} u_i'(x_i) = +\infty$. Assume that prices of both goods are strictly positive, each $p_i > 0$, and wealth is strictly positive, $w > 0$. (The conditions in this problem are sufficient to guarantee that the optimal bundle of goods x^* is interior, i.e. $x^* \gg 0$. So you can ignore inequality constraints of the form $x \geq 0$.)
 - (a) Write the consumer's problem as a constrained optimization problem and display the first order conditions for this optimization problem.
 - (b) Show that if wealth increases, then the demand for good 1 increases.
 - (c) What is the sign of the effect of a change in the price of good 1 on the consumer's demand for good 1? Show your work.