Econ 3012 - Midterm Exam

March 6, 2024

1. *Briefly describe the following in a way that a person who* **has not studied economics or mathematics would understand***:*

A. What is price elasticity of demand? What does it mean for demand for a good to be "inelastic".

Price elasticity of demand measures what percentage of change there is in demand when the price of a good goes up by 1% If demand is inelastic than a 1% increase in price leads to less than a 1% decrease in demand.

B. What does it mean for preferences to be "homothetic"?

It means that the way someone is willing to trade off between goods depends only on the ratio or proportions of the goods they consume rather than on the absolute amounts.

C. What are "perfect substitutes preferences"?

Preferences where someones willingness to trade off between two things is always the same.

2. *Fill in the blank.*

A. If a consumer is a borrower and interest rate **decreases**, they will remain a borrower.

B. A good is inferior. If **income** decreases then demand will **increase**.

C. The **marginal rate of substitution** measures the slope of indifference curves.

3. A consumer utility function $min\{x_1, 2x_2\}$. They have an income of m. Prices are p_1, p_2.

A) Write the equation for the consumer's budget line.

$$p_1x_1 + p_2x_2 = m$$

B) What is the "no waste condition" for this consumer?

$$x_1 = 2x_2$$

C) What is the consumer's (Marshallian) demand for x_1 and x_2?

$$x_1 = \frac{m}{p_1 + \frac{1}{2}p_2}, x_2 = \frac{1}{2}\frac{m}{p_1 + \frac{1}{2}p_2}$$

D) What is their **income** elasticity of demand for x_1?

$$1$$

4. A consumer has demand $x_1 = \frac{\frac{1}{4}m}{p_1}$ and $x_2 = \frac{\frac{3}{4}m}{p_2}$

A) Are these goods *complements, substitutes, or neither?*

Neither.

B) At $p_1 = 5$, $p_2 = 5$ and $m = 400$, what is this consumer's demand? What about if p_1 increases to $p_1 = 10$.

$$(20, 60)$$

$$(10, 60)$$

C) Of the change in demand for x_1 in part B, how much is due to the substitution effect?

Needs 500 to afford old bundle. At $m = 500$ they buy:

$$x_1 = \frac{\frac{1}{4}500}{10} = 12.5$$

Thus substitution is responsible for 7.5.

D) Of the change in demand for x_1 in part B, how much is due to the income effect?

Income effect is responsible for 2.5.

5. There are 3 consumer's in a market and each has demand $x = \frac{\frac{1}{3}m_i}{p}$ where m_i is consumer i's income and p is the price of the good. Suppose $m_1 = 10, m_2 = 20, m_3 = 30$.

A) What is the market demand?

$$X = \frac{20}{p}$$

B) What is the market inverse demand?

$$p = \frac{20}{X}$$

C) What price would lead to a market demand of 10?

$$p = 10$$

D) Can we use the representative consumer property here?

Yes.