

Econ 3012 - Midterm Exam

December 9, 2022

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

A. What is a preference relation?

A way of mathematically representing how a consumer compares options that can express whether they like one option strictly more than another or that they are indifferent.

B. Why can't indifference curves slope upwards when preferences are **monotonic**?

If a consumer has monotonic preferences over "bundles" of amounts of two things then getting more of both things must make them strictly better off. However, an indifference curve is a set of bundles that the consumer is indifferent between. If an indifference curve slopes upwards, it implies there is some bundle with strictly more of everything that is indifferent to some bundle with less.

C. What is price elasticity of demand?

It measures how much demand for something changes in percentage terms when price changes by 1%

2. Fill in the blank.

A. A good that is inferior is one where demand *decreases* when *income* increases.

B. If a consumer can compare every possible bundle and say they are indifferent or they strictly prefer one to the other, we say their preferences are *complete*.

C. If demand for a good is inelastic then a 1% increase in the price of that good will lead to *less than 1%* decrease in demand.

3. A consumer has utility function $u(x_1, x_2) = x_1x_2$. Prices are p_1 and p_2 and the consumer's income is m .

A) What is the equation for this consumer's budget line?

$$p_1x_1 + p_2x_2 = m$$

B) What is the marginal rate of substitution for this consumer?

$$-\frac{x_2}{x_1}$$

Suppose for the rest of this question:

$$p_1 = 1, p_2 = 2, m = 200$$

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

$$x_1 = 100, x_2 = 50$$

D) About how much x_2 would the consumer give up to get one more unit of x_1 at the demand in part **C**?

$$-\frac{1}{2}$$

4. A consumer has utility function for consumption today c_1 and next year c_2 of $u(c_1, c_2) = \min\{c_1, c_2\}$. Their income is $m_1 = 600$ and $m_2 = 1500$. The interest rate is r .

A) What is this consumer's budget equation?

$$(1+r)c_1 + c_2 = (1+r)600 + 1500$$

B) What is the optimal bundle of c_1 and c_2 for this consumer at $r = 0.25$?

$$c_1 = 1000, c_2 = 1000$$

C) In part **B**, is this consumer a borrower or a lender/saver?

Borrower

D) If r decreases to 0.1 is the consumer better off or worse off?

Better Off

5. A consumer has demand for two goods of: $x_1 = 5$ and $x_2 = \frac{m-5p_1}{p_2}$ where m is income, and p_1, p_2 are the prices of the two goods.

A) Is x_2 a normal or inferior good?

Normal

B) What is the consumer's price elasticity for x_2 ?

$$\frac{\partial \left(\frac{m-5p_1}{p_2} \right)}{\partial p_2} \frac{p_2}{\frac{m-5p_1}{p_2}} = -1$$

C) What bundle does this consumer demand when $p_1 = 10, p_2 = 2, m = 100$? If p_2 increases to $p_2 = 5$, what is the new bundle the consumer demands?

$$(5, 25), (5, 10)$$

D) Of the change in demand for x_2 from part **C**, how much is due to the income effect? How much is due to the substitution effect?

All due to income