

5SSPP217 Microeconomics
Week 2 exercises
Consumer choice

1. Wen's preferences over goods 1 and 2 are as follows:

$$(y_1, y_2) \preceq (x_1, x_2) \quad \text{if and only if} \quad y_1 \leq x_1 \text{ and } y_2 \leq x_2.$$

- (a) For any given bundle (x_1, x_2) , draw the set of bundles Wen strictly prefers to (x_1, x_2) and the set of bundles she strictly prefers less than (x_1, x_2) in the space of her consumption of goods 1 and 2.
 - (b) Are Wen's preferences complete, monotonic and transitive?
2. Angela's preferences over bundles of two goods satisfy completeness, transitivity, monotonicity and convexity. Consider the bundles $A = (6, 12)$ and $B = (18, 6)$, where $A \sim B$. For the bundle $C = (14, 8)$, what can you conclude about its ranking relative to A and B ? Distinguish between weak preference, strict preference and indifference, and explain your reasoning.
3. Dr Pages' utility function is

$$U(s, t) = s^{1/2}t^{1/3},$$

where s is the quantity of scones and t is the quantity of cups of tea he consumes. He has a budget of B pounds. The price of each scone is $p_s > 0$ pounds and the price of each cup of tea is £1.

Use the Lagrange method to determine his optimal quantities of scones and tea as functions of p_s and B .

4. Mr Richards' preferences can be represented by the utility function

$$U(x, y) = 2x + 5y,$$

where x and y are the quantities of the only two goods he cares about. His budget is £150.

- (a) Suppose that the prices are $p_x = 4$ and $p_y = 15$ pounds. Draw his budget constraint and a few indifference curves. What is his optimal consumption bundle? What is the value of the given utility function at this bundle?
 - (b) Suppose that he can join a buyer's club offering a reduction in the price of good y from £15 to £10. How would his budget constraint change if membership were free? Find all of his optimal consumption bundles at the discounted price. Would he be willing to pay a positive fee to join the club?
5. You are the mayor of a small town. Your budget is m thousand pounds, and you must decide how many sports facilities (good x) and cultural activities (good y) to fund. Each sports facility costs £2,000 and each cultural activity costs £1,000. Citizens' preferences can be represented by

$$U(x, y) = 2 \ln(x) + y,$$

where $x > 0$ and $y \geq 0$.

- (a) Draw the budget constraint and a few indifference curves for $m = 38$. Derive the mathematical expression for the indifference curves before drawing them.

- (b) Assume $m > 2$. Use the Lagrange method to find the quantities of sports facilities and cultural activities that maximise citizens' utility, as functions of m .
- (c) Repeat part (b) with double the budget, $2m$. How does the optimal choice change?
6. **Stretch question.** A consumer's preferences over goods 1 and 2 are represented by the utility function

$$U(x_1, x_2) = \min\{x_1 + 2x_2, 2x_1 + x_2\}.$$

The consumer has a budget of m pounds and faces prices $p_1 > 0$ and $p_2 > 0$ pounds for the two goods.

Draw an indifference curve and find the optimal consumption bundles as functions of p_1 , p_2 and m .