

Practice Exercises: Elasticity, Supply & Utility Maximisation

A.A. 2025/2026

Contents

Part I: Elasticity, Demand and Supply	2
Part II: The Utility Maximisation Problem	3

Part I: Elasticity, Demand and Supply

Exercise 1: Computing the Demand Elasticity

Given the following price–quantity combinations $A = (4, 2)$ and $B = (2, 6)$ (first coordinate is price P , second is quantity Q):

1. Derive the linear demand function that generates them.
2. Provide a graphical representation of the direct and inverse demand curves.
3. Compute the price elasticity of demand at the two points.

Exercise 2: Revenues, Elasticities, Profits

Consider the following total cost and total revenue functions:

$$TC = 4Q, \quad TR = (16 - 2Q)Q.$$

Prove that $|\varepsilon| = 1$ at the revenue-maximising output, and $|\varepsilon| > 1$ at the profit-maximising output.

Exercise 3: Total Cost, Average Cost, Marginal Cost

The table below gives the labour and capital inputs required at each output level.

Output	Labour	Capital
0	0	0
1	1	2
2	2	4
3	3	6
4	4	8
5	5	10

Fixed costs are \$8, unit labour cost is \$3, unit capital cost is \$4. For each output level, compute: (1) total cost; (2) average cost and marginal cost.

Exercise 4: Individual and Aggregate Supply Functions

Firms 1 and 2 have the following supply functions:

$$Q_1 = 3p, \quad Q_2 = \max\{p - 1; 0\}.$$

Represent them graphically and derive the aggregate industry supply function.

Part II: The Utility Maximisation Problem

Exercise 5: Indifference Curves and MRS

Given the utility function:

$$U(x_1, x_2) = x_1^{1/2} x_2^{1/3}$$

Determine:

1. the equation of a generic indifference curve;
2. the indifference curve corresponding to $U = 2$;
3. the slope of the indifference curves.

Exercise 6: Budget Constraint

Given $p_1 = 3$, $p_2 = 5$, income $R = 60$, determine:

1. the equation of the budget constraint;
2. its graph;
3. the slope and the intercepts with the x_1 and x_2 axes.

Exercise 7: The Optimal Bundle

Given the utility function:

$$U(x_1, x_2) = x_1^{1/3} x_2^{2/3}$$

Find the optimal bundle for a consumer with income $R = 90$, $p_1 = 2$, $p_2 = 6$.

Exercise 8: Perfect Complements

Consider the utility function $U = \min\{3x_1, x_2\}$.

Plot the system of indifference curves and verify the convexity of preferences.