

Unit 03

Exercise 04: Demand, Supply, Equilibrium, Shortage, Surplus

Objective: In this assignment, you will apply macroeconomic concepts to solve a personalized problem using your student ID as input. You will derive demand and supply equations, find equilibrium price and quantity, analyse the impact of government policies, and graphically represent your findings.

There is a market with demand and supply curves that described by the following equations:

$$P_d = A_1 - B_1 Q_d$$

$$P_s = A_2 + B_2 Q_s$$

Instructions:

1. **Define parameters A_1 A_2 by using your student ID:** Students ID:
 - Add the first six digits of your student ID repeatedly until a single digit remains.
 - Add the last four digits of your student ID repeatedly until a single digit remains.
 - Compare the two resulting numbers: the smaller one will be A_2 and the larger one will be XXL
 - Now, calculate final $A_1 = XXL + A_2$

Example: Student ID = 66110062;

- a. $6+6+1+1+0+0 = 5$;
- b. $0+0+6+2 = 8$;
- c. $XXL = 8$; $A_2 = 5$
- d. $A_1 = 8 + 5 = 13$

2. **Define parameters B_1 B_2 by using the last digit of your student ID**

- If it is odd, $B_1 = 1.5$ and $B_2 = 2$.
- If it is even, $B_1 = 2$ and $B_2 = 1.5$.

3. **Write Demand and Supply Equations:**

- The demand curve is represented by the equation: $P_d = \text{ } - \text{ } Q_d$
- The supply curve is represented by the equation: $P_s = \text{ } + \text{ } Q_s$

TASK 1

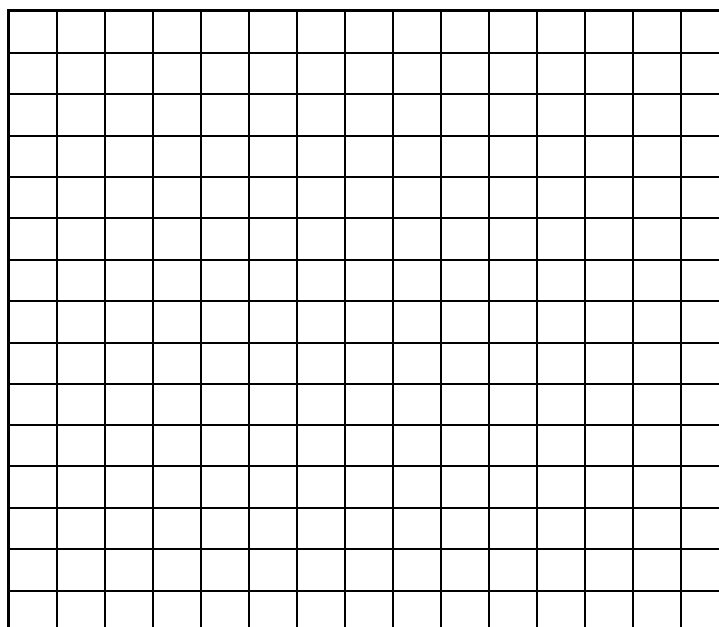
4. **Find equilibrium price and quantity (show how to calculate) for given market situation:**

$$Q_e = \text{ }$$

$$P_e = \text{ }$$

TASK 2

5. **Graph the Demand and Supply Curves:** Plot the demand and supply curves on the same graph. **Clearly** label all axes, **intercepts**, and **equilibrium** points. Ensure your graph is **neat and accurately scaled**, regardless of the tool you use (Excel, Python, MATLAB, or manual drawing). Include a grid for precision.



6. **Analyse the Impact of Government Policy:**

- If the last digit of your student ID is **odd**, the government introduces a **price floor** set at **22% above the market equilibrium price**.
- If the last digit of your student ID is **even**, the government introduces a **price ceiling** set at **27% below the market equilibrium price**.
- Calculate the new price based on the price floor or ceiling.

$P_{\text{new}} =$

- Determine the resulting quantities demanded () and supplied () at the new price.

$Q_{\text{dnew}} =$

$Q_{\text{snew}} =$

- Calculate the size of the surplus or shortage created by the government policy:

The government created a (surplus/shortage) of (size).