

Profit and Profit Maximisation for Monopolies

LLE Mathematics and Statistics

1. You are given the demand function and the total cost function for a monopolist. Use this information to calculate the profit function, π , and the price, quantity, and profit that maximises the profit.

(a) Market demand: $Q = 100 - P$

i. $TC = 250 + 20Q$

ii. $TC = Q^2 - 4Q + 200$

iii. $TC = 100 + 2 \ln(Q + 1)$

(b) Market Demand: $Q = 500e^{-0.2P}$

i. $TC = 100$

ii. $TC = 10 + 15Q$

2. A fish and chip shop knows demand for cod and chips is different for pensioners compared to those who are not pensioners.

Demand for pensioners: $Q_P = 200 - 4P_P$ where P_P is the price charged to pensioners.

Demand for others: $Q_N = 160 - 2P_N$ where P_N is the price charged to non-pensioners.

The shop has fixed costs of 100 and variable costs of $0.5Q$

Find the maximum profits if:

- (a) The shop charges the same price to both groups, $P_P = P_N$
- (b) The shop charges different prices to both groups.