

Demand and Supply Curves Calculation Example

(Note: you will also need information from the cost equations and perfect market sections to answer this question)

In all, there are 100 suppliers who compete for sales of a chemical product. All the firms have a capacity of 15 t week⁻¹ and have identical cost structures for production. For each, the cost of production of a quantity x can be represented by the equation:

$$C = 1000 + 350x + 10x^2$$

where C is the total cost (£ week⁻¹) and x is the output (t week⁻¹)

Collectively, the total production of all the firms is q (t week⁻¹) and the whole market demand curve can be represented by the equation:

$$p = 1100 - 0.4q$$

where p is the market price (£ t⁻¹)

- (a) For one individual company, calculate the output at which the average cost (**AC**) is minimum, the minimum average cost and the marginal cost (**MC**) at the same output.
- (b) For one individual company, calculate the quantity of production if the market price were:
 - (i) £650 t⁻¹
 - (ii) £600 t⁻¹
 - (iii) £550 t⁻¹

Hence derive an equation for the supply curve applicable to this one company.

- (c) Now derive the equation for the whole market supply curve. [Note: this is an aggregation of the individual supply curves].
- (d) Assuming a perfect market calculate the equilibrium market quantity and the equilibrium market price.
- (e) For one individual company operating at the equilibrium conditions, calculate the total revenue, the total cost and the total profit.