



1. Consider two firms, Firm 1 and Firm 2, in a duopoly market. Both firms have linear marginal cost production technology, where their marginal cost (MC) is given by:

$$MC_i = c_i + cq_i$$

where  $c_i$  is the constant marginal cost and  $q_i$  is the quantity produced by Firm  $i$ . And  $c > 0$

- a) calculate the reaction function for both firms
- b) find the cournot nash equilibrium
- c) find the stackelberg solution if firm 2 acts as a leader
- d) find the solution if they merge in one firm and act as a monopoly
- e) for a given price  $\bar{p}$  what will happen to the solution in iv if they act in a competitive market.

2. Given a Production function

$$q = z_1^a z_2^b$$

- a) Find the conditional demand functions for  $z_1$  and  $z_2$ .
- b) Find the cost function.
- c) Find the supply function.
- d) Find the input demand (Marshallian) function for  $z_1$ . Briefly explain other ways of deriving the demand function
- e) How do they exhibit decreasing returns to scale?