

- Consider a market with market demand $P(Q) = 53 - 6Q$ and each firm in the market faces a total cost $TC(Q) = 17Q$.
Suppose there is only one firm in the market.
 - What is the profit-maximizing price and quantity be in the market?
 - What are the profits and consumer surplus?**Now suppose there are two firms in the market.**
 - What is the equilibrium price and market quantity?
 - What is the consumer surplus and profits *for each firm*?
 - What happens to total market profits and consumer surplus as we increase from one to two firms?
- Consider a market with demand $P(Q) = 108 - 2Q$ in which two firms compete. Firm 1 faces $TC_1(Q) = 48Q$ and firm 2 faces $TC_2(Q) = 36Q$.
 - Find the reaction function for firm 1.
 - Find the reaction function for firm 2.
 - Find the Cournot equilibrium (Q_1^*, Q_2^*, P^*) .
 - Determine profits for each firm and consumer surplus.
- Consider a market with demand $P(Q) = 120 - 3Q$ in which nine firms compete. All firms face $TC(Q) = 30Q$. Let $X = Q_2 + Q_3 + \dots + Q_9$.
 - Write out the residual demand curve for firm 1 in terms of X and Q_1 .
 - Find the corresponding marginal revenue.
 - What is the reaction function for firm 1 (in terms of X).
 - Find the Cournot equilibrium (market quantity Q^{M*}, P^*).
 - Determine profits for each firm.
- Consider a market with demand $P(Q) = 100 - Q$. Suppose that firms compete by setting prices in a Bertrand duopoly. Assume the following:
 - firms can only set prices in *full dollars*.
 - if you are indifferent between more than one price, you always set the lowest price.
 - Write out the reaction function for each firm (this should tell what price one firm should set for **all** prices that the other firm could set between 0 and ∞).
 - If $MC_1 = 50$ and $MC_2 = 50$, what price does each firm set in the Bertrand equilibrium.
 - If $MC_1 = 50$ and $MC_2 = 40$, what price does each firm set in the Bertrand equilibrium.
- Consider a market with demand $P(Q) = 42 - 2Q$ in which two firms compete. Firm 1 faces $TC_1(Q) = 9Q$ and firm 2 faces $TC_2(Q) = 4Q$. Suppose that firm 1 chooses their quantity first, then firm 2 sees that quantity, and then firm 2 sets their quantity (Stackelberg duopoly).
 - Find the reaction function for firm 2.
 - What is the marginal revenue for firm 1 (given that they know that firm 2 will best respond)?
 - Find the Stackelberg equilibrium (Q_1^*, Q_2^*, P^*) .
 - Determine profits for each firm and consumer surplus.
 - Which firm is better off?
- Suppose that Pepsi and Coke are competing in a horizontally differentiated Bertrand market and setting prices. The demand curves are as follows:
$$Q_C = 40 - 5P_C + 4P_P$$

$$Q_P = 100 - 2P_P + P_C$$

Coke face marginal cost $MC_C = 12$ and Pepsi faces marginal cost $MC_P = 8$.

 - Write the equation for the demand for coke in terms of price P_C as a function of P_P and Q_C .
 - Determine the marginal revenue for Coke as a function of P_P and Q_C .
 - Find the equation that tells how much Coke would produce for any price P_P using the above.
 - Find the reaction function for Coke (P_C as a function of P_P) using your answer above.
 - Find the reaction function for Pepsi.
 - Determine the Bertrand equilibrium.