HW 5

1. Consider a market with just one firm. The demand in the market is $p = 18 - Q$ and the firm has a linear cost function $C(Q) = 2Q$.
a. How much output will this firm produce. What will be the profit and consumers surplus?
b. Suppose a second firm with the same cost function enters the market and the two firms compete in a Cournot style (simultaneous output choice). What will be the equilibrium price and quantity in the market? What is the total market profit and CS?

2. Consider a market with inverse demand $p = 100 - 2Q$. Firms have no fixed cost and constant marginal cost c.
a. Derive the firms' outputs and profits when this market is served by Cournot duopolists.
b. How do outputs and profits vary with c? Specifically, use calculus to find the derivative of the output of each firm and profit of each firm with respect to c.
c. Suppose the firm's also have a fixed cost of F in addition to the marginal cost c. How does F alter the best response functions and NE? Explain in words. (For technical reasons, assume that both firms still produce a positive level of output in equilibrium)

3. Two identical firms compete as a Cournot duopoly. The demand they face is P = 100 - 2Q. The cost function for each firm is $C(Q) = 4Q$. The equilibrium output of each firm is:

4. Two identical firms compete as a Cournot duopoly. The demand they face is P = 100 - 2Q. The cost function for each firm is $C(Q) = 4Q$. Each firm earns equilibrium profits of:

5. Two identical firms compete as a Cournot duopoly. The demand they face is P = 100 - 2Q. The cost function for each firm is $C(Q) = 4Q$. In equilibrium, the deadweight loss is: