

#### HW 4:

1. The (inverse) demand in a Cournot duopoly is  $P = a - b(Q_1 + Q_2)$  and cost are  $C_1(Q_1) = c_1Q_1$  and  $C_2(Q_2) = c_2Q_2$ . Show that the Cournot equilibrium levels of output are  $Q_1 = \frac{a + c_2 - 2c_1}{3b}$  and  $Q_2 = \frac{a + c_1 - 2c_2}{3b}$ .
  
2. The market for widgets consists of two firms that produce identical products. Competition in the market is such that each of the firms independently produces a quantity of output, and these quantities are then sold in the market at a price that is determined by the total amount produced by the two firms. Firm 2 is known to have a cost advantage over Firm 1. A recent study found that the (inverse) market demand curve faced by the two firms is  $P = 280 - 2(Q_1 + Q_2)$  and costs are  $C_1(Q_1) = 3Q_1$  and  $C_2(Q_2) = 2Q_2$ .
  - a. Determine the marginal revenue for each firm.
  - b. Determine the reaction function for each firm.
  - c. How much output will each firm produce in equilibrium?
  - d. What are the equilibrium profits for each firm?