ECON 461 Problem Set 2 Summer 2017

Each question will receive equal weight in grading.

1. Let market inverse demand for a duopoly market be given by the equation

$$p = \overline{\rho} - \overline{\rho}\sqrt{\frac{Q}{N}},$$

where $Q = q_1 + q_2$ is total output.

Let the market be supplied by two quantity-setting firms, firms that act as Cournot duopolists in a static, one-period model.

Let each firm produce with constant marginal and average cost c per unit.

Find Cournot equilibrium outputs, price, and profit per firm.

Show the derivations of your answers.

2. Consider a duopoly in which two firms produce different varieties of a differentiated product at constant average and marginal cost 1 per unit. Let the equations of the inverse demand curves be

$$p_1 = 11 - (q_1 + \frac{1}{2}q_2)$$

$$p_2 = 11 - (\frac{1}{2}q_1 + q_2)$$

(both equations valid where the implied prices and quantities are nonnegative).

(a) find Nash equilibrium prices, quantities, and payoffs for a one-shot game if both firms set quantities.

(b) find Nash equilibrium prices, quantities, and payoffs for a one-shot game if both firms set prices.

(c) Compare equilibrium prices in (a) and (b). Which type of competition (in quantities or in prices) has lower equilibrium prices? Why?

Show the derivations of your answers.

3. Based on the material *The Structure of American Industry*, discuss in your own words the impact of

(a) the behavior of oil suppliers that are not members of OPEC, and oil consumers; and

(b) the behavior of OPEC members

on the ability of OPEC to restrict output and influence the price of crude oil.