Youngberg

Econ 304—Bethany College

**Homework 05**

Answer all the following on a ***typed, stapled*** (if applicable)separate sheet of paper. Make sure that you justify your answers, use your own words, and show your work. All questions are equally weighted.

1. Consider a monopoly with P = 5 – Q2 and TC = 1 + Q3. Calculate optimal output, monopoly profit/loss, and (using integration) deadweight loss. Round to the nearest two decimal places.
2. If the monopoly in Question 1 is monopolistically competitive, how much output will it produce in the long run? Using integration, calculate the deadweight loss in the long run. Round to the nearest two decimal places.
3. Under a Bertrand model of monopolistically competitive firms, find the Nash Equilibrium using the information below (report both price and quantity for each firm). Round prices to the nearest two decimal places.

Firm 1’s Demand: Q1 = 12 – 3P1 + P2

Firm 2’s Demand: Q2 = 12 – 3P2 + P1

Firm 1’s Total Costs: TC1 = 2 + Q1

Firm 2’s Total Costs: TC2 = 2 + 2Q2

1. Let’s slightly rework Question 3 for Cournot. Using the original demand curves but isolating P instead of Q (and using the other firm’s Q instead of P), we get:

Firm 1’s Demand: P1 = 4 – ⅓(Q1 + Q2)

Firm 2’s Demand: P2 = 4 – ⅓(Q2 + Q1)

Firm 1’s Total Costs: TC1 = 2 + Q1

Firm 2’s Total Costs: TC2 = 2 + 2Q2

Rounding prices to the nearest two decimal places, find Cournot equilibrium (report both price and quantity for each firm).

1. Suppose the Firm 2 now gets to choose its production level first and Firm 1 responds ala Stackelberg. Using the equations from Question 4 and rounding prices to the nearest two decimal places, find equilibrium (report both price and quantity for each firm).