Name: ________________________________

Instructions:
You must answer exactly 4 of the following 5 questions. Each question is worth the same amount. You have the class period to complete the exam.
Answer each question clearly and concisely. You must show your work to receive credit.
This exam is given under the rules of the Montana State University. You may not use notes or receive any assistance. There is to be no talking during the exam.
Clearly print your name above and in the space provided on the next page. You must turn in both sides of this cover sheet along with your responses. You do not need to turn in the questions, only your responses with the cover sheet.
Industrial Organization
ECNS 406
Fall 2010
Exam #: 1

Name: ____________________________________________

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1. Given an inverse demand function of $P = 120 - 2Q$ and costs for Firm $i$ of $C(q_i) = 18q_i$, find the Cournot duopoly equilibrium:
   (a) Firm Quantity
   (b) Price
   (c) Consumer Surplus
   (d) Deadweight Loss

2. The inverse demand function is $P = 160 - Q$ and each firm’s cost is $C(q_i) = 10q_i + 2q_i^2$. There are two firms who compete in prices. If $P_1 = P_2$ (or $q_1 = q_2$), both firms split the market so that $q_i = \frac{Q}{2}$. The horizontal summation of both firm’s marginal cost curves is $MC(Q) = 2Q + 10$.
   (a) Assume both firms behave as price takers. What are the perfectly competitive equilibrium quantities and prices?
   (b) Assuming that both firms behave as price takers, what is the profit for each firm?
   (c) Consider a multilateral price deviation where each firm lowers their price by $\$1$ from the perfectly competitive level (Take the prices you found in Part a and subtract $\$1$). Is this deviation profitable?
   (d) Consider a multilateral price deviation where each firm increases their price by $\$1$ from the perfectly competitive level (Take the prices you found in Part a and add $\$1$). Is this a profitable deviation?
   (e) Do you think the perfectly competitive equilibrium (determined by assuming firms are price takers) is an equilibrium of the model when firms are not price takers and compete in price? Why or why not?

3. The inverse demand function is $P = 100 - \frac{2}{3}Q$ and there are two firms who compete in quantities. The costs for each firm are as follows.

   \[ C(q_1) = 2q_1 \]
   \[ C(q_2) = c_2 q_2 \]

   $c_2$ is a positive constant.
   (a) What is the best response function for each firm?
   (b) What are the equilibrium quantities for each firm?
   (c) Find the following comparative statics and their sign: \( \frac{dq_1}{dc_2} \), \( \frac{dq_2}{dc_2} \) and \( \frac{dQ}{dc_2} \).
   (d) What is the value of $c_2$ such that $q_2 = 0$?
   (e) On your homework when firm 2’s costs were $C(q_2) = c_2 q_2^2$ there was no value for $c_2$ such that $q_2 = 0$. What’s different here and why is this difference relevant?
4. Two different games are as follows.

(a) In class we discussed that every game has three elements. Describe the elements of the above games?

(b) How are the above games different both in their representation and in their rules?

(c) Describe the Nash equilibrium/equilibria of each game.

(d) Why do the two games lead to different results?

5. Measures of market performance

(a) How do you calculate the industry average Lerner index, what does it measure, and what do the values imply (e.g. small values imply X, large values imply Y)?

(b) How do you calculate the HHI, what does it measure, and what do the values imply?

(c) An industry has 5 firms, the HHI is 0.8125 and the Lerner index is close to zero.
   i. How would you describe this industry?
   ii. Should the government regulate it?
   iii. How does your answer apply to the efficiency critique?