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 #: 2

Name: ____________________________________________

<table>
<thead>
<tr>
<th>Question</th>
<th>Points</th>
<th>Score</th>
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<tbody>
<tr>
<td>1</td>
<td>25</td>
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Total: 125
1. Given an inverse demand function of \( P = 100 - 2Q \) and costs for Firm \( i \) of \( C(q_i) = 20q_i \), find the Stackelberg duopoly equilibrium:
   
   (a) Firm Quantities
   (b) Market Price
   (c) Firm Profits
   (d) Consumer Surplus
   (e) How do your answers compare with the Cournot Duopoly equilibrium?

2. Consider a linear city Hotelling model. There are two firms, A and B, located at the ends of the product space. The length of the product space is 3 and transportation costs are 1 times the distance traveled. Each consumer has a baseline valuation of 9 and each firm has a constant marginal cost of 4. Answer the following questions for the competitive equilibrium if it exists.
   
   (a) What is each firm’s best response function?
   (b) Are the two goods strategic complements or strategic substitutes?
   (c) What are the equilibrium prices and quantities?
   (d) Find the profits of each firm.
   (e) Find the consumer surplus.

3. Answer the following questions:
   
   (a) What is a factor that influences the expected punishment received from the formation of a cartel?
   (b) What are some pricing practices that facilitate non-cooperative collusion?
   (c) Why don’t anti-trust authorities ban the specific pricing practices you mentioned in part b?
   (d) How does the size and frequency of transactions influence cartel stability?
4. Given an inverse demand function of \( P = 100 - 5Q \) and costs for firm \( i \) of \( C(q_i) = 25q_i \), answer the following questions:

(a) What is the Cournot duopoly equilibrium firm quantity, market quantity and price?

(b) Now instead of Cournot competition, suppose the two firms choose to differentiate their products. Each consumer’s baseline valuation is 100 and consumers are uniformly distributed around a circular preference space. The circular preference space has a circumference equal to the Cournot duopoly equilibrium market quantity in part a. Firm costs remain the same and each consumer must incur a transportation cost of 2 times the distance traveled. What is the equilibrium price with product differentiation?

(c) Using the above scenarios, do firms want to produce standardized or differentiated products?

(d) Using the above scenarios, do consumers want the firms to produce standardized or differentiated products?

5. The inverse demand function is \( P = 70 - 2Q \) and costs for firm \( i \) are \( C(q_i) = 14q_i \). The interest rate is \( r \). Assume throughout this question that when firms compete in prices and both firms choose the same price, they split the market evenly. Answer the following questions:

(a) If firms tacitly collude to maximize profits, find the discounted sum of profits when firms compete in prices, the discounted sum of profits when firms compete in quantities and describe how these two measures are different.

(b) If firms compete in prices and do NOT collude, what is each firms discounted sum of firm profits?

(c) If firms compete in prices, what is the present value benefit of deviating from a collusive equilibrium given that the other firm uses a trigger strategy.

(d) When is it easier to maintain tacit collusion: when firms compete in prices or compete in quantities?

(e) When is it easier to tacitly collude: when firms compete in prices or compete in quantities?