Intermediate Microeconomics
ECNS 301
Spring 2013

Exam #: 3
Version A

Monday April 29, 2013

Name: 

Instructions:
You must answer all of the following 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. By printing your name above you acknowledge the University’s Honor Code and agree to comply with the provisions of the Honor Code. You may not use notes or receive any assistance. There is to be no talking during the exam. You may use a calculator, but are never allowed to use device allowing you to take photographs or transmit over a network. No notes, no assistance, no talking, no cell phones, but you can use a calculator.

Clearly print your name above, in the space provided on the next page and in your blue book(s). You must turn in the exam and your blue book(s). There are two versions of the exam. Indicate your exam version on your blue book. It is your responsibility to make sure your version of the exam is different from the students next to you. If you have the same version as any of the students next to you, you will be asked to move.
True/False/Uncertain Plus Explanation

1. For each of the following, state whether it is true, false or uncertain and explain your answer. No points are given without explanation.

   (a) If a firm in a competitive market is currently producing a quantity where price exceeds the marginal cost, the firm should increase its quantity.

   (b) Producer surplus equals total revenue minus the sum of all marginal costs.

   (c) If the monopoly’s demand curve intersects the average variable cost curve at the minimum average variable cost, the firm will shut down.

   (d) If neither firm has a dominant strategy, a Nash Equilibrium cannot exist.

Short Answer/Numerical

2. Consider the following strategic form game in Figure 1. The payoffs are listed as the (payoff to the player on the left, payoff to the player on top).

   Figure 1: A strategic form game for Question 2

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Player 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Player 2</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>(0,1)</td>
</tr>
<tr>
<td>B</td>
<td>(-1,3)</td>
</tr>
</tbody>
</table>

   (a) Derive the best response function for each player.

   (b) What is the Nash Equilibrium of this game and is it unique?

   (c) Use the payoff matrix in Figure 1 to model the extensive form game where Player 1 chooses first.

   (d) How does the outcome change if instead of simultaneous decisions, we model an extensive form game where Player 1 chooses first?

   (e) Does it make a difference is Player 2 chooses first instead?
3. There are many buyers and ONE seller. Buyers will only buy one unit if their willingness to pay is above the equilibrium price. The distribution of buyer’s willingness to pay and the monopolist’s marginal cost is as follows.

<table>
<thead>
<tr>
<th>Buyer’s Willingness to Pay</th>
<th>10</th>
<th>10</th>
<th>9</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>7</th>
<th>5</th>
<th>5</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monopolist’s Marginal Cost</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

(a) Graph the demand curve.
(b) Find the revenue and cost associated with each point on the demand curve.
(c) What is the equilibrium price and quantity?
(d) What is the equilibrium total surplus?

4. There are 100 consumers and each consumer has the following preferences for the goods \( x \) and \( y \)

\[
    u(x, y) = \max\{x, 2y\}
\]

and each consumer has an income level of \( m = 24 \). Firms produce good \( x \) with the following production technology.

\[
    x = 2K + L
\]

Firms produce good \( y \) with the following production technology.

\[
    y = K + 3L
\]

\( K \) is the amount of capital used in production which has a rental rate of \( r = 8 \) and \( L \) is the amount of labor used in production with a wage rate of \( w = 21 \).

(a) What are the market demand curves for goods \( x \) and \( y \)?
(b) What are the firm’s cost functions for goods \( x \) and \( y \)?
(c) If both firms act as price takers, what are the market equilibrium prices and quantities for goods \( x \) and \( y \)?
(d) If both firms act as price takers and the government imposes a per unit tax on labor of $6, what are the market equilibrium prices and quantities for goods \( x \) and \( y \)?

5. The market demand and supply are as follows.

\[
    P = 75 - 2Q
\]
\[
    P = 3 + Q
\]

Suppose there there are many sellers, but only one buyer in this market.

(a) What is the buyer’s objective?
(b) Determine the market equilibrium price and quantity.
(c) Compare the equilibrium you found to the perfectly competitive equilibrium.
(d) What is the loss in efficiency associated with having only one buyer?