Intermediate Microeconomics
ECNS 301
Fall 2014

Exam #: 3
Version B

Thursday December 11, 2014

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 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) One of the points of the movie we watched in class is that investors should hold mutual funds in their retirement portfolio rather than buying individual stocks.

   (b) The main point of the Prisoner’s Dilemma game is to show that the optimal solution is always reached when each player follows their dominant strategies.

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

   (d) A firm never produces at a price below their average cost.

Short Answer/Numerical

2. 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 seller’s marginal cost is as follows.

   | Buyer’s Willingness to Pay | 10 | 10 | 9 | 9 | 8 | 7 | 7 | 5 | 5 | 4 |
   | Seller’s Marginal Cost      | 8  | 7  | 7 | 5 | 5 | 4 | 3 | 3 | 2 | 2 |

   (a) Graph the demand curve.

   (b) Graph the marginal cost curve.

   (c) What is the equilibrium price and quantity?

   (d) What is the equilibrium total surplus?
3. A consumer has the following utility function.

\[ U(x, y) = \ln(x) + y \]

Given prices \( p_x = 1, p_y = 10 \) and income \( m = 30 \):

(a) find the marginal rate of substitution,

(b) find the interior solution to the consumer’s utility maximization problem,

(c) find the corner solutions to the consumer’s utility maximization problem,

(d) find the optimal consumption bundle of \( x \) and \( y \).

(e) If the price of good \( y \) is \( p_y = 2 \), how does you answer to part d change?

4. There are 80 consumers and each consumer has the following preferences for the goods \( x \) and \( y \)

\[ u(x, y) = \min \left\{ 2x, \frac{1}{12} y \right\} \]

and each consumer has an income level of \( m = 144 \). Firms produce good \( x \) with the following production technology.

\[ x = L^{\frac{1}{3}} K^{\frac{1}{3}} \]

\( K \) is the amount of capital used in production which has a rental rate of \( r = 12 \) and \( L \) is the amount of labor used in production with a wage rate of \( w = 3 \). Also, each firm that produces \( x \) must pay $384 for protection services. Firms product good \( y \) with the following production technology

\[ y = L + 2K \]

and firms that produce \( y \) do not have to pay for protection services.

(a) What are the market demand curves for goods \( x \) and \( y \)?

(b) What is a firm’s cost function for good \( x \)?

(c) What is a firm’s cost function for good \( y \)?

(d) If both markets are perfectly competitive, what are the market equilibrium prices and quantities?

(e) If both markets are perfectly competitive, how many firms product good \( x \)?