Intermediate Microeconomics
ECNS 301
Fall 2014

Exam #: 2
Version A

Thursday November 6, 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) The change in total welfare from a 10% increase in price will depend only on the elasticity of demand.
   (b) The length of the short run is the same for all firms.
   (c) You should stop studying for your economics exam once you reach the point of diminishing returns.
   (d) A firm may express increasing, constant and decreasing returns to scale for various levels of output.

Short Answer/Numerical

2. A firm’s production function is as follows.

   \[ q = KL^2 + 13L + 4 \]

   (a) What is the marginal product of labor and the average product of labor?
   (b) Find the marginal rate of technical substitution as a function of just \( K \) and \( L \).
   (c) Find the value of \( L \) that minimizes the average product of labor.
   (d) At what value of \( K \) does the average product of labor equal the marginal product of labor?
3. Consumer’s consume food and other goods. The amount of food consumed is denoted $f$ with price $p_f$ and the amount of other goods is denoted $y$ with price $p_y$. In order to support farmers (and low income consumers), the state of Montana is considering subsidizing the price of food so that the quantity of food consumed by every consumer is 30. With the price subsidy the price of food becomes $p'_f = p_f - \tau$ where $\tau$ is the amount of the per unit subsidy. There are 1 million people in Montana and each person has the following preferences.

$$U(f, y) = \min\{f, 2y\}$$

$p_y$ is normalized to 1, $p_f = 7$, income is $m = 90$, and the price subsidy considered is $\tau = 5$.

(a) How does the price subsidy change the optimal consumption bundle of each consumer? What was it before the subsidy and after?

(b) Will the food subsidy achieve it’s objective?

(c) What are the substitution effects and income effects associated with the price subsidy for both $y$ and $f$?

(d) What is the change in consumer welfare due to the price subsidy?

4. A firm’s production function is $q = K^2L$ where $q$ is the quantity produced, $K$ is the amount of capital used, and $L$ is the amount of labor used. $w$ is the wage rate of labor and $r$ is the rental rate of capital.

(a) In the short run when capital is fixed, how much labor should the firm hire?

(b) In the short run when capital is fixed, what is the short run cost function?

(c) In the long run, how much labor and capital should the firm use?

(d) What are the long run costs?