Intermediate Microeconomics
ECNS 301
Spring 2012

Exam #: 1
Version A

Friday February 10, 2012

Name: ________________________________

Instructions:
Answer all of the following questions. 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.
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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 the government increases the tax on alcohol, use of marijuana will increase.

(b) A consumer with convex, ‘well-behaved’ indifference curves is indifferent between two bundles of $X$ and $Y$: $(6, 10)$ and $(8, 6)$. She therefore prefers the bundle $(7, 7)$ to either of the first two.

(c) Both Tums and Rolaids will cure David’s heartburn, and he regards them as perfect substitutes. Therefore, his indifference curves will be linear with a slope of $-1$.

(d) The equilibrium price of elbow grease is $5$ per kilogram, but the government has in place a price ceiling at $3$ per kilogram. Shoulder grease is a substitute for elbow grease. If the price of shoulder grease falls, then the shortage of elbow grease will grow larger.

Short Answer/Numerical

2. The market demand function for a particular good is

$$Q = 50 - 2p + 8p_r$$

where $Q$ is the market quantity, $p$ is the market price, and $p_r$ is the price of a related good. The market supply curve is described by the following.

$$Q = 6 + 2p$$

(a) Are the two goods substitutes or complements?

(b) Find the market equilibrium price and quantity when $p_r = 7$, and when $p_r = 13$.

(c) What is the comparative static $\frac{dp}{dp_r}$?

(d) When thinking about the demand for this good, are consumers more sensitive to a change in the price, $p$ or more sensitive to a change in the price of the related good, $p_r$. 
3. Consider the following constrained multivariate optimization problem.

$$\max_{x,y} f(x, y) = 5x^2y$$
subject to $20x + 15y = 90$

For the parts below, always consider $y$ to be on the vertical axis and $x$ to be on the horizontal axis.

(a) What is the Lagrangian for this problem?

(b) Find the optimal values of $x$ and $y$.

(c) What is the value of $f(x, y)$ evaluated at the optimal values of $x$ and $y$? Call this value $A$ where $A = f(x^*, y^*)$.

(d) Find an equation for a curve ($y$ as a function of $x$) such that $f(x, y) = A$ where $A$ is the value you found in the part above.

(e) Show that the slope of the curve you found above by setting $f(x, y) = A$ is equal to the slope of the constraint at the optimal values of $x$ and $y$.

4. You decide to quit school, travel back in time, and work at a mine. Your mining job pays $50 per month. The company store only sells cans of beans for $1 and bottles of whiskey for $5. Every month you buy 15 cans of beans and 7 bottles of whiskey.

(a) What’s an equation describing your budget line and what’s the slope of your budget line?

(b) Assuming prices don’t change, the government imposes a 10% tax on whiskey, but decides to give poor miners (that’s you) a subsidy of $3.50 per month. What’s an equation describing your new budget line?

(c) Do you prefer the status quo or the new policy with the whiskey tax and subsidy, and why?

(d) The next election year comes around and the government now decides to give everybody a subsidy worth 10% of their income. An unintended consequence of this policy is that the inflation rate increases and prices are 8% higher. Are consumers better off or worse off and why?