Econ421: Math Econ: Study Guide 1

(1) Identify and/or define. Briefly define the following terms. In most cases, the definition should be done using both ordinary English and equations.

A. Concave Function
B. Continuous Function
C. Differentiable Function
D. Demand Function
E. Supply Function
F. Utility Function
G. Production Function
H. Cost Function
I. Monopolistic Competition
J. Constrained Optimization
K. Rational Choice

(2) Short Answer Questions

A. Suppose that Al' total benefits from studying are $B=bT^2$ and that here opportunity cost for studying is $C=cT$. How many hours should she study?

B. Suppose that Acme's profits from sales of its product is $\Pi=PQ-C$ and $C=Q^2/100$, if the market price for its output is \$0.05 each, how many units should Acme produce and sell?

C. Suppose that Al's utility function is $U = Q^{.5}/10$ and he has 10 dollars to spend. How many units should he purchase if the price of this good is \$2/unit?

D. Mathematically, what does it mean to say that an individual's demand curves slopes downward?

E. Mathematically, what does it mean to say that production exhibits diminishing marginal returns (in terms of a firm's cost function)?

F. Given a Cobb-Douglas utility function and a budget constraint, what are the normal steps to deriving an individuals demand function for one of the goods in his or her utility function?

G. Given a cost function exhibiting diminishing returns, what are the normal steps for deriving a firm's supply curve?

H. Given a Cobb-Douglas production function, what are the normal steps for deriving its cost function?

I. Given market demand and supply functions, what are the normal steps for determining the market clearing price and the total extent of the goods sold in the market of interest.

J. What is the normal method of characterizing a market demand curve given the "average" consumers' demand curve?

K. What is the normal method for determining a monopoly's output and pricing decision, given its demand function and cost function?

(3) Longer Problems

A. The exam will include 2 or 3 longer problems as well. The best method to review for these is to **redo the homework problem sets**, since the Ecampus site includes both those problems and answers to those problems. You should rework them to improve your speed and confidence at working these and similar problems.

(A reasonable **speed** at solving similar problems, especially the shorter ones, will be required to do well on the midterm. Although the exam will be designed to reduce the necessity for speed, it can not totally eliminate it, given that we'll have a time constraint.)

B. In addition, or if you have trouble with them, try working the illustrating examples in the web notes and class notes without looking at the methods used to develop the answers until you can't figure out what to do next. Then look at what was done in class or in the webnotes for the step that you are finding difficult, and continue working on your own until you run into the next roadblock. After you've overcome all your roadblocks, work the derivation again.

(Keep in mind that the very longest derivations in the webnotes and in class are—of course—too long for on the exam.)

C. Suppose that Al has a 2-good Cobb-Douglas Utility Function, derive his or her demand curve for both goods in that utility function.

D. Suppose that Acme has the cost function $C = 250Q^2P_LP_K$, derive Acme's supply curve. Given that curve assume that there are M similar firms in this market. What is the market supply curve for this good?

E. Suppose that Apex faces a downward sloping market demand curve $Q = 10000 - .005P$ and has the cost function $C = 0.001Q^2$. Find Apex's profit maximizing price and output if it will sell all of its output at the same price per unit sold. Repeat with other demand and cost function(s).