Ecn 100 - Intermediate Microeconomics
University of California - Davis May 12, 2010
Instructor: John Parman

Midterm 2

You have until 1:00pm to complete this exam. Be certain to put your name, id number and section on both the exam and your scantron sheet and fill in test form A on the scantron. Answer all multiple choice questions on your scantron sheet. Choose the single best answer for each question; if you fill in multiple answers for a question you will be marked wrong. Answer the long answer questions directly on the exam. You must show your work for full credit. Answers may be left as fractions. Please place a box around final answers when appropriate. Good luck!

Name: **ID Number:** **Section:**

SECTION I: MULTIPLE CHOICE (60 points)

1. Suppose that the only two goods a consumer buys are bread and butter and she always spends her full income on those two goods. If butter is a luxury good, we can say for certain that the income elasticity of bread is:
   (a) Greater than one.
   (b) Less than negative one.
   (c) Greater in magnitude than the income elasticity of butter.
   (d) Less than one.
2. Suppose that a firm uses a technology that exhibits decreasing returns to scale. Currently the firm is producing 100 units of output at a total cost of $200. If the firm decides to cut output to 50 units by reducing all inputs by a constant proportion, the firm's new total costs will be:
   (a) Equal to $100.
   (b) Greater than $100.
   (c) Less than $100.
   (d) Not enough information.
3. Suppose goods X and Y are both normal goods. When the price of good Y increases, we can say for certain that:
   (a) The income effect for Y will be negative.
   (b) The substitution effect for X will be positive.
   (c) The income effect for X will be negative.
   (d) All of the above.
4. Free disposal of inputs will typically guarantee that a production technology:
   (a) Is convex.
   (b) Exhibits constant returns to scale.
   (c) Is monotonic.
   (d) Exhibits diminishing technical rate of substitution.

5. There are two consumers for widgets. Both consumers have linear demand curves that hit a quantity of zero when the price of a widget reaches \$10. On a graph with quantity on the horizontal axis and price on the vertical axis, the slope of the first consumer's demand curve is -1 and the slope of the second consumer's demand curve is -2. The slope of the market demand curve will be:
   (a) $-\frac{1}{3}$.
   (b) -3.
   (c) $-\frac{2}{3}$.
   (d) None of the above.

   For problems 6 and 7, use the following information. Cheerios and milk are the only two goods you consume. Your demand for bowls of cheerios (C) and glasses of milk (M) in terms of the price of a bowl of cheerios (p_C), the price of a glass of milk (p_M) and your income income (I) are given by the following equations:

$$C = \frac{I}{p_C + 2p_M} \tag{1}$$

$$M = \frac{2I}{p_C + 2p_M} \tag{2}$$

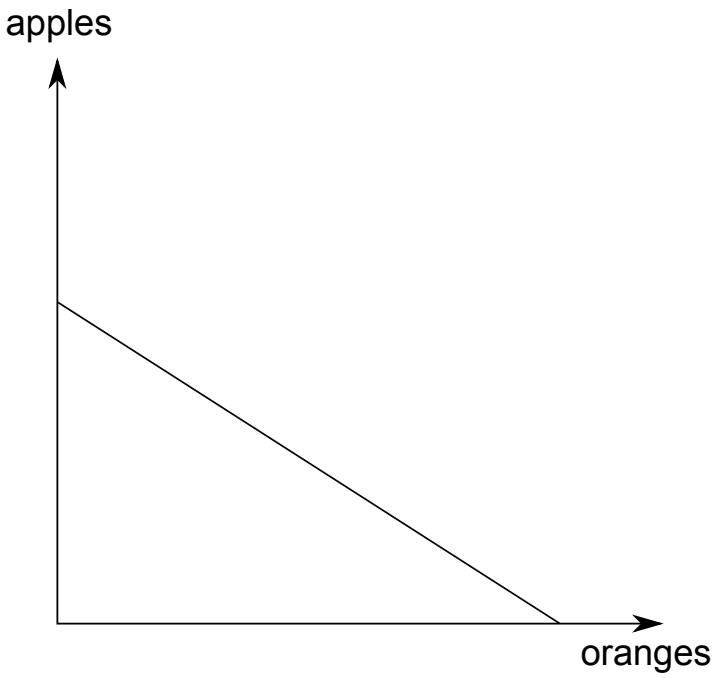
6. When the price of cheerios decreases, the sign of the substitution effect for milk will be _____ and the sign of the income effect for milk will be _____.
   (a) Positive, positive.
   (b) Positive, negative.
   (c) Negative, positive.
   (d) Positive, positive.
7. When the price of milk increases, the magnitude of the subsitution effect for cheerios will be:
   (a) Greater than the magnitude of the income effect for cheerios.
   (b) Equal to the magnitude of the income effect for cheerios.
   (c) Less than the magnitude of the income effect for cheerios.
   (d) Not enough information.
8. Suppose that the price of output is \$4, the price of a unit of capital is \$12, and the price of unit of labor if \$8. If labor is fixed in the short run and capital is variable, what will the marginal product of capital be for the last unit of capital used by a profit-maximizing firm? (You can assume that the short run profit-maximizing combination of inputs contains positive, finite quantities of both inputs.)
   (a) 3.
   (b) $\frac{3}{2}$.
   (c) $\frac{1}{3}$.
   (d) Not enough information.

9. Using the same information as question 8, what will the marginal product of labor be for the last worker used by a profit-maximizing firm? (You can assume that the short run profit-maximizing combination of inputs contains positive, finite quantities of both inputs.)
   (a) 2.
   (b) $\frac{3}{2}$.
   (c) $\frac{1}{2}$.
   (d) Not enough information.
10. Which of the following production functions does not exhibit a dimishing technical rate of substitution?
   (a) $f(K, L) = KL$.
   (b) $f(K, L) = K^{\frac{1}{2}}L^{\frac{1}{2}}$.
   (c) $f(K, L) = K^2 + L^2$.
   (d) None of the above.
11. If a market has a downward sloping, linear demand curve and an upward sloping, linear supply curve, a value tax placed on consumers will definitely:
   (a) Generate tax revenue greater than the loss in producer surplus and the loss in consumer surplus combined.
   (b) Generate tax revenue greater than the deadweight loss.
   (c) Generate tax revenue less than the loss in producer suprlus and the loss in consumer surplus combined.
   (d) Generate tax revenue equal to the deadweight loss.
12. We would expect the price elasticity of demand for Dell laptops to be (you can assume Dell laptops are normal but not luxury goods):
   (a) Greater in magnitude than the price elasticity of demand for laptops in general.
   (b) Smaller in magnitude than the price elasticity of demand for laptops in general.
   (c) Smaller in magnitude than the price elasticity of demand for computers in general.
   (d) Greater than zero.
13. If capital is fixed in the short run and labor is variable, the level of short run profits a firm can make:
   (a) Does not depend on the price of capital.
   (b) Does not depend on the price of labor.
   (c) Does not depend on the price of output.
   (d) None of the above.
14. Which of the following technologies exhibits constant returns to scale?
   (a) $f(K, L) = KL$.
   (b) $f(K, L) = K^{\frac{1}{2}}L^{\frac{1}{2}}$.
   (c) $f(K, L) = K^{\frac{1}{2}} + L^{\frac{1}{2}}$.
   (d) None of the above.

15. A store determines that customer demand for DVDs is very elastic. The store can increase revenues by:
    (a) Increasing the price of DVDs.
    (b) Decreasing the price of DVDS.
    (c) The answer depends on the cost of producing a DVD.
    (d) None of the above.

SECTION II: SHORT ANSWER (40 points)

1. (10 points) The graph below shows the initial budget line for a consumer who buys only apples and oranges. Apples and oranges are normal goods and they are substitutes. On the graph below, show the change in demand for oranges decomposed into the part due to the income effect and the part due to the substitution effect when the price of apples decreases. Include any relevant budget lines, indifference curves and consumption bundles.



2. (15 points) Suppose that a firm uses screws (S) and nails (N) as its two inputs. One screw can always be substituted for two nails. The firm can produce output according to the following production function:

$$f(S, N) = 10S + 5N \tag{3}$$

   (a) What is the marginal product of nails (MP_N)?

   (b) In the short run, the number of screws a firm has is fixed at 10 but the firm can choose any number of nails it wants. The price of a unit of output is \$1, the price of a nail is \$5 and the price of a screw is \$10. Draw a graph with the number of nails used on the horizontal axis and output on the vertical axis. Show the short run production function on this graph as well as the isoprofit line that corresponds to profits of \$100. Be certain to label all slopes and intercepts with their numerical values.

   (c) How many nails will the firm use and how many units of output will the firm produce in the short run?

3. (15 points) Suppose that market demand for water in Davis is perfectly inelastic. Davis residents will always consume a total of 100 gallons of water each day no matter what the price of water is. Water supply is given by an upward-sloping, linear supply curve. Currently, the equilibrium price of a gallon of water is \$5. Suppose that Davis places a \$1 per gallon tax on water suppliers. On a graph with gallons of water on the horizontal axis and price of water per gallon on the vertical axis, use appropriate supply and demand curves to show the effects of this tax. The following items should be shown on your graph and clearly labeled. If any of the items cannot be shown on the graph, include a one sentence explanation of why they cannot be graphed.
    - The original equilibrium price and quantity before the tax.
    - The new eqilibrium quantity, price paid by consumers and price received by producers after the tax.
    - The change in consumer surplus.
    - The change in producer surplus.
    - The tax revenue.