

Name: _____

Student Number: _____

MIDTERM EXAMINATION II ECO 2144 B:

Monday, November 15th, 2010

Instructions:

Each multiple choice question is worth **1 mark**. Marks for the short answer questions are indicated at the end of the questions. Total marks = **40**.

For the multiple choice questions, please circle the correct answer in the test paper. If you need to change your answer, very clearly cross out your previous answer and circle and arrow to the correct answer. If the distinction between your old and new answers is not clear, no marks will be awarded.

Short answer problems should be answered in the space provided. Be sure to show all your work. Diagrams should be clearly labeled and explained.

This exam consists of **10** pages (1 blank) and **20** questions.

You have **1 hour and 15 minutes** to complete the exam.

No aids (including calculators!) are permitted.

Good luck.

1. Suppose a consumer buys two goods, x and y and has income of \$24. Initially $P_x = 1$ and $P_y = 2$ and the consumer chooses basket A with $x=12$ and $y=6$. The prices change to $P_x = 1.50$ and $P_y = 1$ and the consumer chooses basket B with $x=10$ and $y=9$.
 - a) These choices are consistent with utility maximization.
 - b) These choices are not consistent with utility maximization.
 - c) With this information it is not possible to determine if these choices are consistent with utility maximization.
 - d) Basket B must be strictly preferred to basket A .

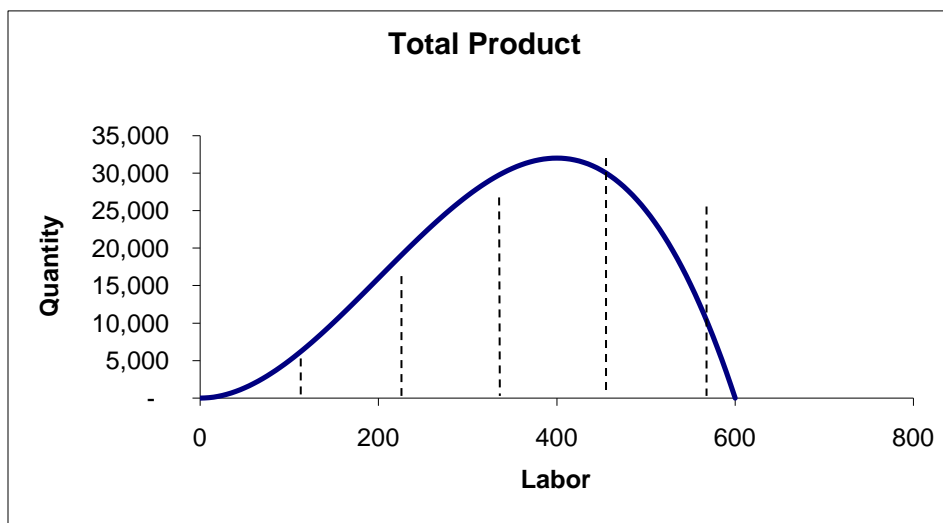
2. Which of the following is held constant along an income-consumption curve?
- Income.
 - Good x .
 - Good y .
 - Prices of goods x and y .
3. In order to identify a consumer's demand curve from an optimal choice diagram we
- change the consumer's income, holding the prices of both goods constant, and identify the baskets the consumer chooses with each income level.
 - change the price's of both goods, holding income constant, and identify the baskets the consumer chooses with each price level.
 - change the price of one good, holding income and the price of the other good constant, and identify the baskets the consumer chooses with each price level.
 - change the price of one good and then change the income level so that the consumer achieves the same level of utility as before the price change and then identify the optimal consumption baskets at each price level.
4. The substitution effect associated with a change in price describes
- the change in the level of consumption as a result of the consumer's change in utility, holding price constant.
 - the change in the level of consumption, holding utility constant.
 - the change in relative purchasing power.
 - both a) and c) are correct.
5. Suppose the consumer's utility function is given by $U(x, y) = x^2 + y^2$ where

$$MU_x = 2x \quad MU_y = 2y$$

The equation for this consumer's demand curve for x is

- $x = \frac{I}{P_x}$
- $x = 2I$
- $x = \frac{I}{P_x + \frac{P_y}{P_x}}$
- $x = \frac{I}{2P_x}$

6. Consider a market with $Q^d = 200 - 5P$ and $Q^s = 5P$. What is the consumer surplus in this market?
- a) 2,000
 - b) 1,000**
 - c) 750
 - d) 500
7. The concept of equivalent variation means
- a) the change in income necessary to hold the consumer at the final level of utility as price changes.**
 - b) the change in income necessary to restore the consumer to the initial level of utility as price changes.
 - c) the income effect.
 - d) the substitution effect.
8. We could use the term “bandwagon effect” to describe which of the following situations?
- a) I get great satisfaction from collecting rare coins because few people have them.
 - b) I purchase Eudora Pro as my e-mail software package because all of my friends and family use it.**
 - c) I purchase more chocolate bars because the price of chocolate bars falls.
 - d) I decide not to purchase a Toyota Camry because, as I tell my friend, “Every other car on the road these days looks like a Camry.”



9. In the graph above, diminishing marginal returns set in at labor equals
- a) 100
 - b) 200
 - c) 300
 - d) 400
10. In the graph above, when labor equals 100
- a) average product is less than marginal product
 - b) average product is greater than marginal product.
 - c) average product is equal to marginal product.
 - d) the relationship between average product and marginal product cannot be determined from a total product graph.
11. The rate at which one input can be exchanged for another input without altering the level of output is called the
- a) marginal product curve.
 - b) average product curve.
 - c) marginal rate of technical substitution.
 - d) law of diminishing marginal productivity.
12. Identify the true statement.
- a) Decreasing returns to scale and diminishing marginal returns are just two different ways of saying the same thing.
 - b) Returns to scale pertains to the impact of increasing all inputs simultaneously; diminishing marginal returns pertains to the impact of changing a single input while holding all other inputs constant.
 - c) Returns to scale pertains to the impact of changing a single input while holding all other inputs constant; diminishing marginal returns pertains to the impact of increasing all inputs simultaneously.
 - d) Returns to scale can be identified by calculating the slope of an isoquant.
13. When a production function can be expressed as $Q = (aK)(bL)$, the relationship between capital and labor in the production function is that
- a) capital and labor are perfect substitutes, and the isoquants are linear.
 - b) capital and labor must be combined in fixed proportions, and the isoquants are L-shaped.
 - c) capital and labor are easily substituted, and the isoquants are convex to the origin.

d) capital and labor are perfect substitutes, and the isoquants are L-shaped.

14. You decide to purchase a new car for \$12,000. Upon driving the car off of the lot, the resale value of the car falls to \$9,000. The opportunity cost of purchasing the car is _____ and the opportunity cost of using the car is _____

- a) \$12,000 and \$9,000.
- b) \$12,000 and \$3,000.
- c) Unknown and \$9,000.
- d) Unknown and \$3,000.

15. Suppose for a particular production function that

$$MP_L = 36\left(\frac{K}{L}\right) \quad MP_K = 36\left(\frac{L}{K}\right)$$

If the price of capital is \$5 per unit and the price of labor is \$125 per unit, at the cost-minimizing combination of capital and labor the firm should employ

- a) five times as much labor as capital.
- b) five times as much capital as labor.
- c) 125/36 units of capital and 5/36 units of labor.
- d) 36/125 units of capital and 36/5 units of labor.

Short Answer Problems: Please show all your work. Diagrams should be clearly labeled and explained.

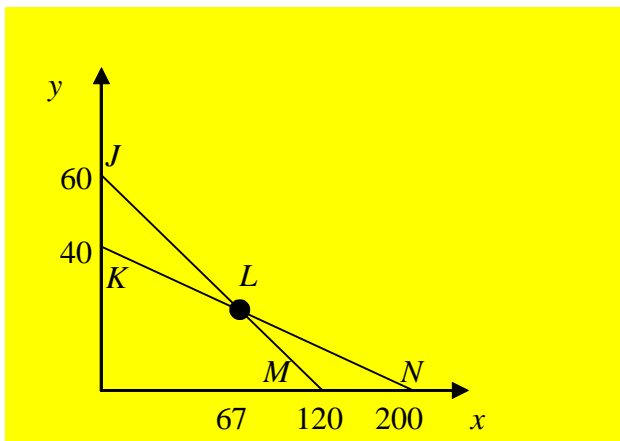
16. Darrell has a monthly income of \$60. He spends this money making telephone calls home (measured in minutes of calls) and on other goods. His mobile phone company offers him two plans.

Plan A: Pay no monthly fee and make calls for \$0.50 per minute

Plan B: Pay a \$20 monthly fee and make calls for \$0.20 per minute

- a. Graph Darrell's budget constraint under each of the two plans (both on the same graph). Assume that the price of "other goods" is 1. **(5 marks)**

Let x denote the number of phone calls, and y denote spending on other goods. Under Plan A, Darrell's budget line is JLM . Under Plan B, it is $JKLN$. These budget lines intersect at point L , or about $x = 67$.



- b. Which plan would Darrell prefer? Explain your answer **(2 marks)**

It would depend on his preferences. Here you could draw a hypothetical set of indifference curves for which the optimal basket would be on BL1 between J and L to represent someone who would prefer Plan A and another set of indifference curves for which the optimal basket would be on BL2 between L and N to represent someone who would prefer Plan B.

True, False or Uncertain? Answer the following with True/False/Uncertain and justify your answer. Marks are only given for the explanations.

**** Diagrams are required for full marks for questions 17 and 18.**

17. A chair manufacturer hires its assembly-line labour for \$25 per hour and calculates that the rental cost of its machinery is \$100 per hour. One chair can be produced using 4 hours of labour or machinery in any combination. Under these conditions, the firm will minimize its costs by employing 3 hours of labour and 1 hour of machine time. **(8 marks)**

The production function described is

$$Q = \frac{1}{4}(K + L)$$

Clearly the two inputs are PERFECT SUBSTITUTES. The isoquants are straight lines.

Given the prices of the inputs, does the tangency condition hold?

$$\frac{MP_L}{MP_K} = \frac{w}{r}$$

$$\frac{0.25}{0.25} \neq \frac{25}{100}$$

Therefore we must have a corner solution – thus, the answer to the question is FALSE, it is not optimal to use a combination of inputs. To determine which input to use, verify which input provides the greatest bang for the buck.

$$\frac{MP_L}{w} = \frac{0.25}{25} > \frac{0.25}{100} = \frac{MP_K}{r}$$

Thus only labour will be employed (optimal input combination to produce one chair is 4 hours of labour and no capital).

Ideally you would want to include a graph illustrating this result in your answer.

18. The demand curve is upward-sloping when the good is an inferior good and the income effect outweighs the substitution effect. **(6 marks)**

True – this is the case of a Giffen good

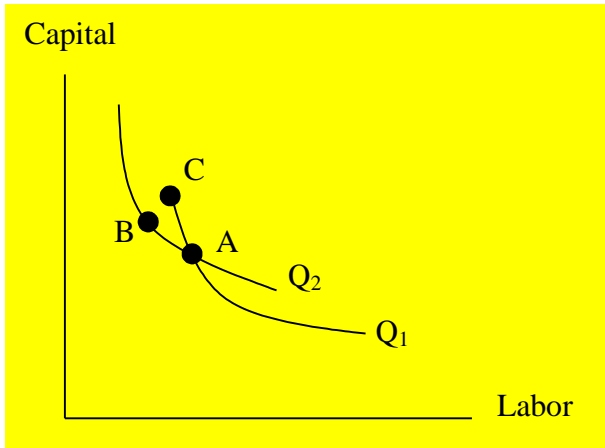
See Figure 5.9 in the text

Ideally you would also want to graph the two optimal baskets (A and C in figure 5.9 on a demand curve graph (with axis P and Q)

ANSWER ONLY ONE OF THE FOLLOWING TWO

19. Isoquants can cross at most one time. (4 marks)

FALSE, as with indifference curves, isoquants can never cross. For example, suppose we draw isoquants for two levels of output Q_1 and Q_2 with $Q_2 > Q_1$. In addition, suppose that these isoquants crossed at some point A as in the following diagram.



Because A and B are on Q_2 , both achieve the same level of output. Since A and C are on Q_1 , both achieve the same level of output. This would imply that B and C achieve the same level of output. However, this is not possible since point C contains more of both inputs which would achieve a higher level of output. Therefore, isoquants cannot cross.

OR

20. If a firm's production function is characterized by a Cobb Douglas production function, there are constant returns to scale. **(4 marks)**

$$Q = AL_1^\alpha K_1^\beta$$

$$Q_\lambda = A(\lambda L_1)^\alpha (\lambda K_1)^\beta$$

$$= \lambda^{\alpha+\beta} AL_1^\alpha K_1^\beta$$

$$= \lambda^{\alpha+\beta} Q$$

So the returns to scale will depend on the value of $\alpha+\beta$.

$\alpha+\beta = 1$... *CRS*

$\alpha+\beta < 1$... *DRS*

$\alpha+\beta > 1$... *IRS*