

Name \_\_\_\_\_

Last 4 Digits \_\_\_\_\_

Test 2  
Economics 321  
Professor Chappell  
October 17, 2006

Total Points on Test: 100

**Part I. Multiple Choice** (3 points each). Unless you are told otherwise, you should accept all of the assumptions made in our textbook!

- 1) A consumer chooses goods X and Y, subject to a budget constraint. Good X is an inferior good. True or False: If the usual assumptions about preferences hold, then good Y cannot be an inferior good.
  - i) True
  - ii) False
  
- 2) Which equation represents the budget line for a consumer buying quantities of two goods,  $x$  and  $y$  of two goods subject to prices  $p_x$  and  $p_y$  and income  $I$ .
  - i)  $p_x = I - p_y y$
  - ii)  $I = p_x x + p_y y$
  - iii)  $y = \frac{I}{p_x} + \frac{p_y}{p_x} x$
  - iv)  $MU_x p_x = MU_y p_y$
  
- 3) If we plot the quantity  $x$  on the horizontal axis and the quantity  $y$  on the vertical axis, then the slope of the budget line is:
  - i)  $-\frac{MU_x}{MU_y}$
  - ii)  $-\frac{p_y}{p_x}$
  - iii)  $-\frac{p_x}{p_y}$
  - iv)  $MRTS_{L,K}$

- 4) Again consider the budget constraint for goods X and Y. Assume that the quantity  $x$  is on the horizontal axis and the quantity  $y$  is on the vertical axis. If  $p_x$  increases:
- The new budget line will shift out from the origin and will have the same slope as the original budget line.
  - The new budget line will shift out from the origin and will be flatter than the original budget line.
  - The new budget line will rotate in towards the origin and will have the same slope as the original budget line.
  - The new budget line will rotate in towards the origin and will be steeper than the original budget line.
- 5) Again consider the budget constraint for goods X and Y. Assume that the quantity  $x$  is on the horizontal axis and the quantity  $y$  is on the vertical axis. Now suppose that  $I$ ,  $p_x$  and  $p_y$  all double. As a result:
- The new budget line will shift out from the origin and will have the same slope as the original budget line.
  - The new budget line will shift out from the origin and will be flatter than the original budget line.
  - The new budget line will rotate in towards the origin and will be steeper than the original budget line.
  - The new budget line will be the same as the original budget line.
- 6) Again, a consumer is maximizing her utility by choosing two goods subject to a budget constraint and there is an interior optimum (no corner solution). At this point:
- The slope of the budget line is equal to the slope of the consumer's indifference curve.
  - The chosen point is on the budget line and on the consumer's indifference curve.
  - Marginal utility per dollar is the same for each of the two goods.
  - All of the above.
- 7) Suppose that at an arbitrary consumption bundle, that a consumer's marginal utility of apples is 6 utils/apple and the marginal utility of bananas is 4 utils/banana. The price of apples is \$2/apple and the price of bananas is \$1/banana. This consumer:
- Would be better off if he shifted some spending from bananas to apples.
  - Would be better off if he shifted some spending from apples to bananas.
  - Would be better off if he spent less on all goods.
  - Would be better off if he spent all of his income on apples.

- 8) An Engel curve plots:
- i) The path of optimal consumption choices in an indifference curve diagram as the price of one good changes.
  - ii) The path of optimal consumption choices in an indifference curve diagram as income changes.
  - iii) The amount of a good consumed versus income.
  - iv) The amount of a good consumed versus the price of the good.
- 9) Fred buys two goods, Snickers bars and oatmeal. Oatmeal is an inferior good, but Snickers are normal. Suppose that the price of oatmeal rises. As a consequence of the income effect:
- i) Fred will buy more Snickers and more oatmeal.
  - ii) Fred will buy fewer Snickers and more oatmeal.
  - iii) Fred will buy more Snickers and less oatmeal.
  - iv) Fred will buy fewer Snickers and less oatmeal.
- 10) Again assume that Fred buys two goods, Snickers bars and oatmeal. Oatmeal is an inferior good, but Snickers are normal. Suppose that the price of oatmeal rises. As a consequence of the substitution effect:
- i) Fred will buy more Snickers and more oatmeal.
  - ii) Fred will buy fewer Snickers and more oatmeal.
  - iii) Fred will buy more Snickers and less oatmeal.
  - iv) Fred will buy fewer Snickers and less oatmeal.
- 11) Again assume that Fred buys two goods, Snickers bars and oatmeal. Oatmeal is an inferior good, but Snickers are normal. Suppose that the price of oatmeal rises. Then:
- i) For Fred, the quantity of oatmeal demanded must fall.
  - ii) For Fred, the quantity of oatmeal demanded must rise.
  - iii) For Fred, the quantity of oatmeal demanded must fall if oatmeal is a Giffen good.
  - iv) For Fred, the quantity of oatmeal demanded must rise if oatmeal is a Giffen good.

- 12) Suppose that the price of gasoline rises. Which of the following describes Betty's compensating variation?
- i) The compensating variation is the amount that Betty would have to be paid to permit her to continue to consume the same amount of gasoline and the same amount of all other goods as she did before the price increase.
  - ii) The compensating variation is the amount of income that Betty would have to receive in order for her to continue to choose the same amount of gasoline as before the price change.
  - iii) The compensating variation is the amount of income that Betty would have to be paid to keep her at her original utility level after the price change.
  - iv) The compensating variation is the amount of income reduction that would produce the same utility loss that Betty experiences when the price of gasoline rises.
- 13) Suppose that the price of gasoline rises. Which of the following describes Betty's equivalent variation?
- i) The equivalent variation is the amount that Betty would have to be paid to permit her to continue to consume the same amount of gasoline and the same amount of all other goods as she did before the price increase.
  - ii) The equivalent variation is the amount of income that Betty would have to receive in order for her to continue to choose the same amount of gasoline as before the price change.
  - iii) The equivalent variation is the amount of income that Betty would have to be paid to keep her at her original utility level after the price change.
  - iv) The equivalent variation is the amount of income reduction that would produce the same utility loss that Betty experiences when the price of gasoline rises.
- 14) Which statements about a consumer's quasi-linear utility function,  $U = y + x^5$  is false? (Here  $y$  is the amount of all other goods, measured in dollars worth units. Also,  $MU_x = .5x^{-5}$ )?
- i) Good X is an inferior good
  - ii) The marginal utility of  $y$  is constant.
  - iii) If income were to change, the consumer would not change the amount  $x$  consumed.
  - iv) If  $p_x$  were to rise, the consumer's compensating variation would be equal to the equivalent variation.

15) Consumer surplus is measured by:

- i) The amount a seller is willing to sell a unit of the good for, less the amount that he had to pay for it.
- ii) The area under a consumer's demand curve and above zero out to the quantity where the demand curve intersects the horizontal axis.
- iii) The area under a consumer's demand curve and above the market price, out to the quantity purchased.
- iv) The area under a consumer's supply curve and below the market price, out to the quantity purchased.

16) The "production set" refers to:

- i) A set of points (combinations of outputs) on the production possibility frontier.
- ii) A set of points (combinations of inputs) that yield a given output.
- iii) A set of points (combinations of inputs and outputs) that represent feasible production plans according to the production function.
- iv) A set of points (combinations of inputs and outputs) that represent production plans that are equally costly to a firm.

17) Which equation defines the marginal product of labor?

- i)  $MP_L = f(K, L) / L$
- ii)  $MP_L = f(K, L) / Q$
- iii)  $MP_L = \frac{\Delta Q}{\Delta L} \Big|_{K=\bar{K}}$
- iv)  $MP_L = \frac{\Delta Q}{\Delta L} \Big|_{L=\bar{L}}$

18) Which statement is false?

- i) When the average product of labor is increasing in labor, marginal product is greater than average product.
- ii) When the average product of labor is decreasing in labor, marginal product is less than average product.
- iii) When the average product of labor is neither increasing nor decreasing in labor (it is at a maximum) then marginal product can be either increasing or decreasing.
- iv) The average product of labor is equal to output divided by the quantity of labor.

19) A higher elasticity of substitution implies that:

- i) Two inputs, capital and labor, do not easily substitute for one another in production.
- ii) The slope of an isoquant varies considerably with the capital labor ratio.
- iii) The marginal product of capital is high relative to the marginal product of labor.
- iv) None of the above.

20) Suppose all inputs are doubled, and output goes up by more than double. The production function exhibits:

- i) Constant returns to scale.
- ii) Constant marginal returns to labor.
- iii) Increasing marginal product of labor.
- iv) Increasing returns to scale.

21) Consider the Cobb-Douglas production function,  $Q = 2K^5L^5$ . For this function, the

marginal product of capital is  $MP_K = \left(\frac{L}{K}\right)^5$  and the marginal product of ~~capital~~<sup>labor</sup> is

$MP_L = \left(\frac{K}{L}\right)^5$ . This production function exhibits:

- i) Constant returns to scale, diminishing marginal returns to labor, and diminishing marginal returns to capital.
- ii) Constant returns to scale, increasing marginal returns to labor, and diminishing marginal returns to capital.
- iii) Constant returns to scale, diminishing marginal returns to labor, and increasing marginal returns to capital.
- iv) Increasing returns to scale, diminishing marginal returns to labor, and diminishing marginal returns to capital.

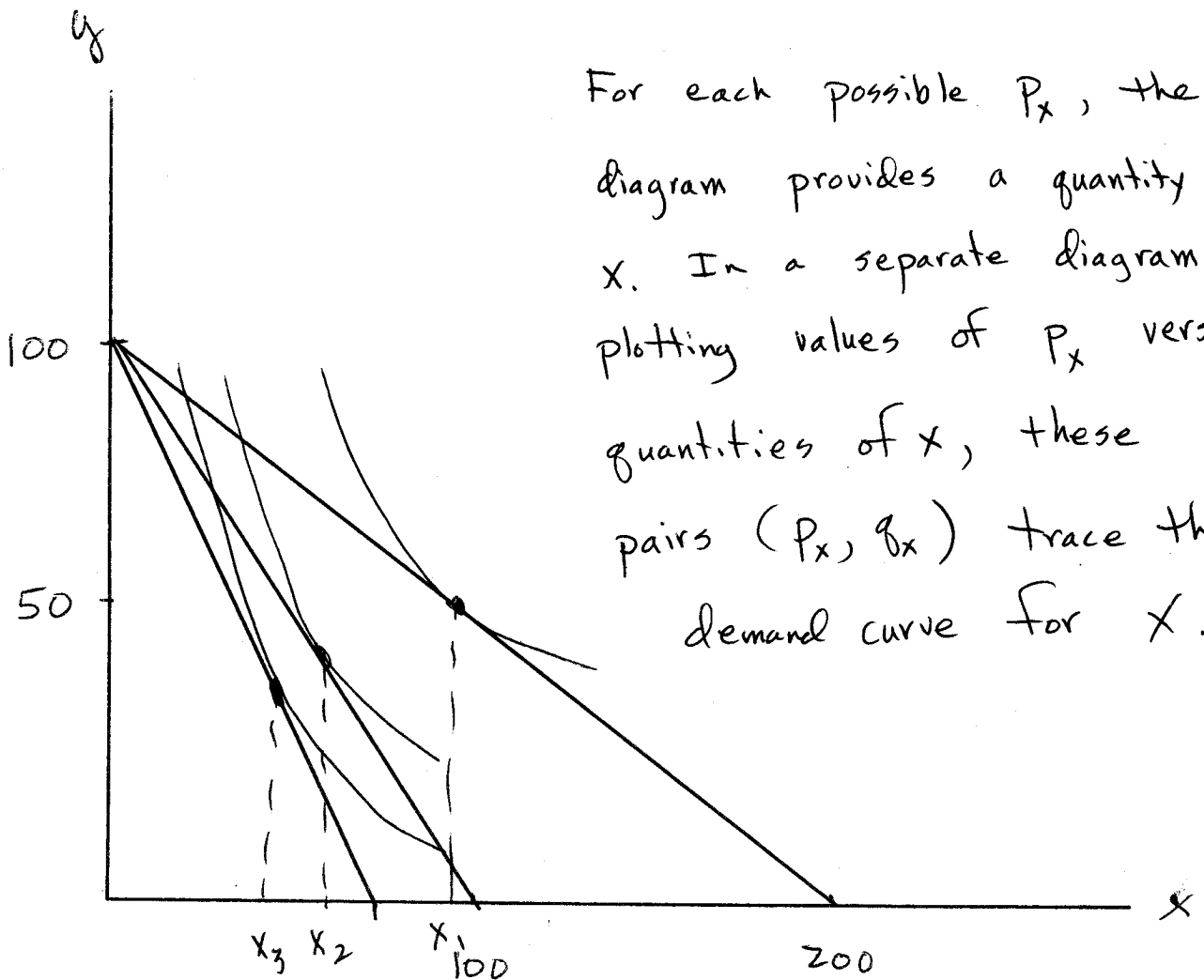
22) The marginal rate of technical substitution is:

- i) The (absolute value of) the slope of an isoquant.
- ii) The (absolute value of) the slope of an indifference curve.
- iii) The (absolute value of) the slope of the production possibility frontier.
- iv) The (absolute value of) the slope of the total product curve.

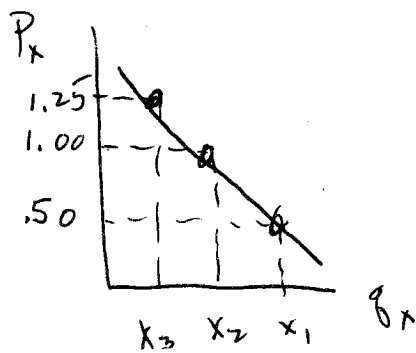
**Part II. Analytical Questions**

**Question 1 (12 points)**

Suppose that a consumer has \$100 to spend on two goods, X and Y. The price good Y is  $p_y = \$1.00$ . In a diagram show the consumer's budget line for  $p_x = \$0.50$ . Then show the budget line for  $p_x = \$1.00$ , and again for  $p_x = \$1.25$ . Draw indifference curves to show the consumer's optimal choice under each of the three price scenarios. Finally, carefully explain how your diagram can be used to derive the consumer's demand curve for good X.



For each possible  $P_x$ , the diagram provides a quantity of  $x$ . In a separate diagram, plotting values of  $P_x$  versus quantities of  $x$ , these pairs  $(P_x, q_x)$  trace the demand curve for  $x$ .

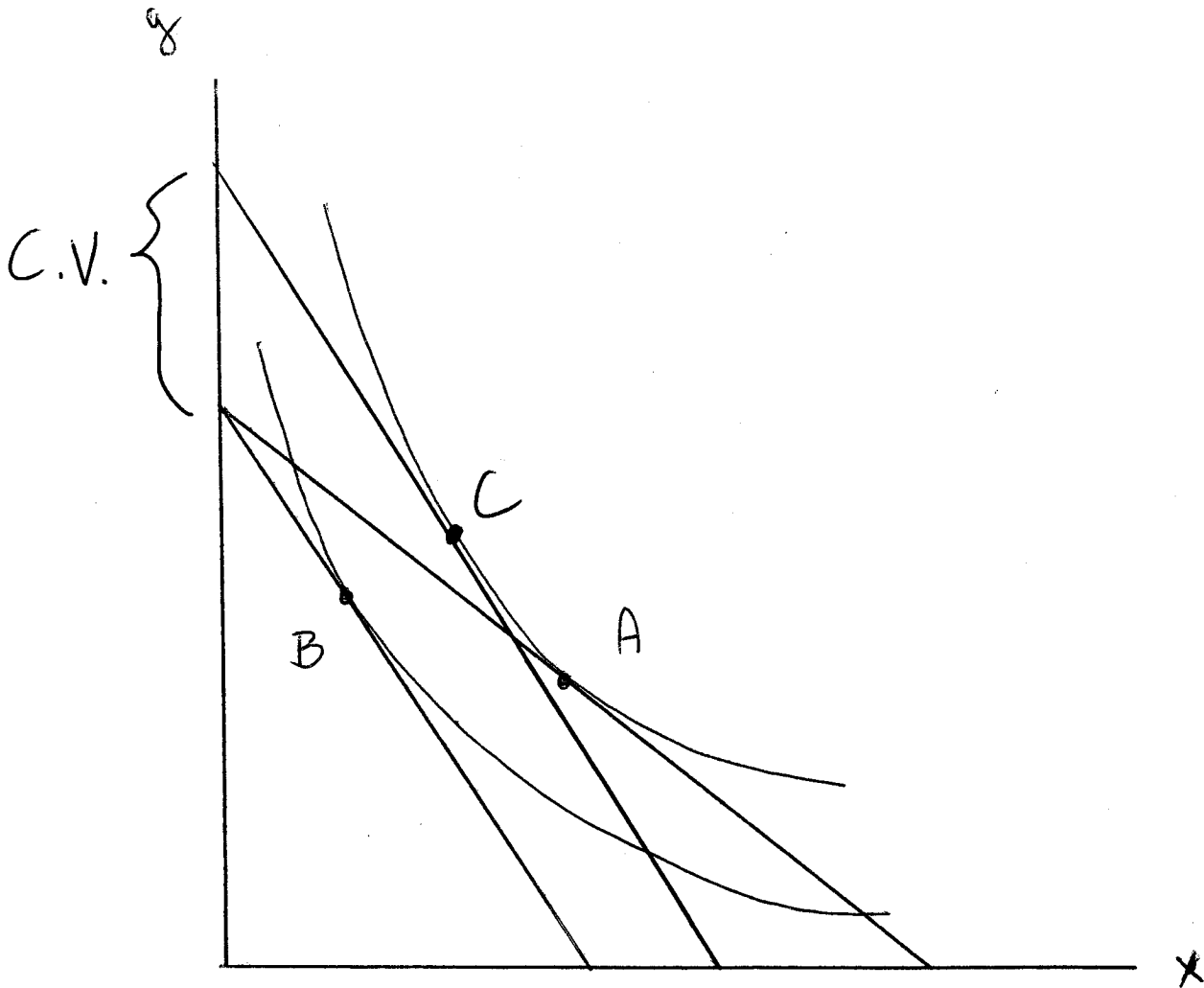


**Question 2 (11 points)**

A consumer chooses quantities  $x$  and  $y$  subject to a budget constraint. The diagram below shows the effect of an increase in  $p_x$  on the consumer's choice of the two goods (initially the consumer is located at point A; ultimately the consumer ends up at point C). Add to this diagram as needed to decompose the effects of the increase in  $p_x$  into income and substitution effects.

Specifically, show a point B, such that the movement from A to B is the substitution effect, and the movement from B to C is the income effect.

Assuming that  $y$  is "all other goods" measured in dollars-worth units, illustrate the compensating variation associated with the change in price.



**Question 3 (11 Points)**

Suppose that Stanley initially has an income of \$1000 per month, which can be spent on food or all other goods. Food, like all other goods, is measured in dollars-worth units, so the price of each good is \$1.00.

Now suppose that the government has decided to give Stanley \$500 in food stamps. Food stamps can be used just like money when purchasing food, but they cannot be used to buy other goods. In the diagram below, carefully shade in the set of affordable bundles under the food stamp program. Indicate Stanley's chosen bundle (given the provided indifference curves).

Suppose that the government had instead given Stanley \$500 in cash. Plot his budget line. Is Stanley better off under the cash transfer program or under the foodstamp program? Briefly explain.

