

Test #1 – Econ 6401
Fall 2007 – Dr Rupp
9 Questions worth 11 points each (unless otherwise indicated)

Name _____

Sign Pledge _____
“I have neither given nor received aid on this exam”

1. (12 points) For the following function: $z = 10x - x^2 + 20y - y^2$

a. Find the first order conditions and corresponding values of x and y that either minimize or maximize the function z .

b. Show all of the second order conditions.

c. Do the above values for x and y minimize or maximize the function?

2. Use a Lagrangian function to solve the following: Jill has a utility function given by: $U = X^{1/3}Y^{2/3}$, where the price of X and Y are: $P_x = \$1$ and $P_y = \$2$ and money income = \$100.

Find the utility maximizing choice of X and Y.

3. For the utility function: $U(x,y) = 2\sqrt{y} + \sqrt{x}$

a. (2 pts) Does this consumer believe that more-is-better for good x? (Show your work)

b. (1 pt) Does the consumer believe that more-is-better for good y? (Show your work).

c. (2 pts) Does the consumer's preferences exhibit diminishing marginal utility of X? (show work).

d. (1 pt) Does the consumer's preferences exhibit diminishing marginal utility of X? (show your work).

e. (2 pts) What is the marginal rate of substitution: $MRS_{x,y}$?

f. (1 pt) Is the $MRS_{x,y}$ diminishing, constant, or increasing with respect to x (show your work)

g. (2 pts) In words, tell me the definition of the MRS (no formulas or mathematical definitions).

4. Jackson likes two pieces of ham and one slice of cheese on his ham-and-cheese sandwich.

- A. (6 pts) On a graph below draw three indifference curves for Jackson which reflect his preferences where $I_3 \succ I_2 \succ I_1$

Ham

_____ Cheese

- B. (5 pts) If ham costs \$0.50 per piece and cheese costs \$0.20 per slice, find Jackson's optimal bundle of ham and cheese purchases given his income is \$12.

5. In each situation listed below, draw three indifference curves where $I_3 \succ I_2 \succ I_1$

A. (4 pts) Pollution and television sets

Pollution

_____ Televisions

B. (4 pts) Squash (which you do not like) and sweet potatoes (which you like)

Squash

_____ Sweet Potatoes

C. (3 pts) You like DVDs three times as much as you like VHS cassettes.

DVDs

_____ VHS

6. A. (4pts) Use the following information to sketch Kenny's budget constraint (label it "original budget"), where $P_x = \$2$, $P_y = \$6$, and money income is \$60. (Label your intercepts)

Y

X

- B. (3pts) What is the equation of the above "original budget" line?

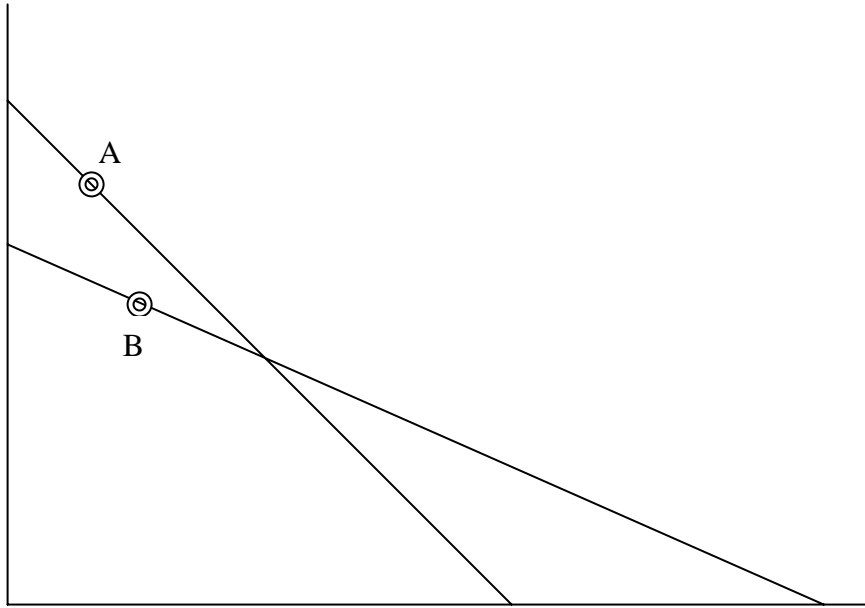
- D. (4 pts) Suppose the government issues \$30 worth of coupons to Kenny which are used only to purchase good X. On the graph above, show the new budget constraint, label it "new budget".

7. Are the following choices consistent with or inconsistent with a consumer maximizing utility? Why or why not?

At $P_x = \$1$ and $P_y = \$3$, consumer chooses basket A: $X = 5$ and $Y = 2$.

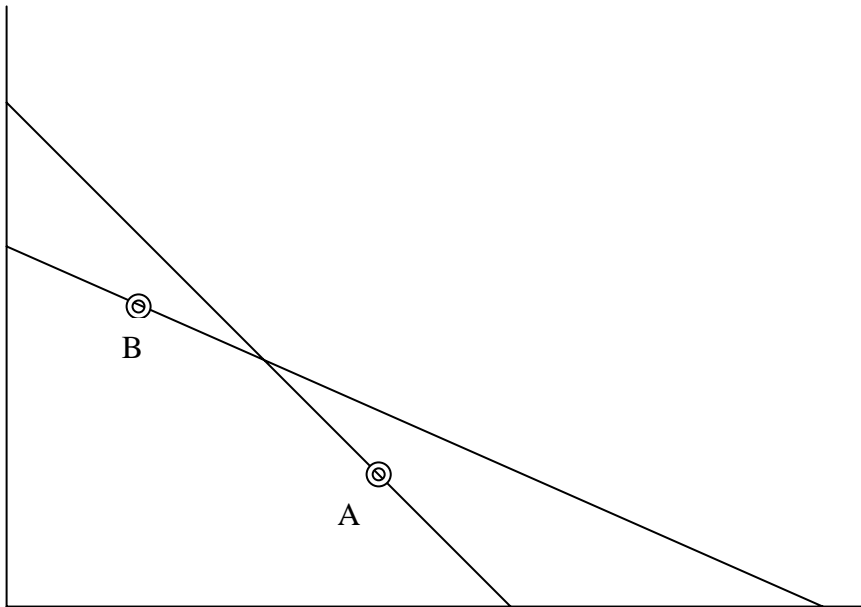
At $P_x = \$2$ and $P_y = \$2$, consumer chooses basket B: $X = 2$ and $Y = 3$.

8. The consumer initially chooses Bundle A. After a change in the budget constraint the consumer chooses Bundle B.



- A. (4 pts) Are these choices consistent or inconsistent with utility-maximizing behavior? Explain why or why not.
- B. (4 pts) How does the consumer rank the two bundles? (If no ranking is possible, then state “cannot be determined”). Explain your ranking.
- C. (3 pts) On your graph, shade in the area that is revealed to be less preferred than bundle A.

9. The consumer initially chooses Bundle A. After a change in the budget constraint the consumer chooses Bundle B.



- A. (6 pts) Are these choices consistent or inconsistent with utility-maximizing behavior? Explain why or why not.
- B. (5 pts) How does the consumer rank the two bundles? (If no ranking is possible, then state “cannot be determined”). Explain your ranking.

Extra Credit (+3 points) - The price per pack of gum is 20 cents and the price of a fire ball is 5 cents. Jack is currently consuming 6 packs of gum and 16 fire balls. He is willing to give up 1 pack of gum for 3 fire balls. Money income is \$2. What should Jack do to increase his utility?

- A. Do nothing, since already maximizing utility.
- B. Buy more fire balls and less gum.
- C. Buy more gum and less fire balls.