

ECON 310

Assignment #2

Due: September 26, 9:00 am

Please write your answers on a separate piece of paper and show all of your work.

Please write legibly!

Use the following information for problems 1-3. Alice consumes goods X and Y. Alice's utility function is given by $U=X*Y$. From this equation, we know that $MU_x= Y$ and $MU_y= X$.

1. Suppose Alice has an income of \$120, the price of X, $P_x = \$3$, and the price of Y, $P_y = \$6$. [4 pts]

- i. Write the equation for Alice's budget line. Draw this graphically with good Y on the y-axis and good X on the x-axis. Make sure to label the intercepts.
- ii. What is the marginal value of X in terms of Y { $MV_{x/y}$ } at her optimal bundle?
- iii. What is the optimal bundle of X and Y? (Hint, use two equations: the budget constraint and the relationship between the indifference curve and budget constraint at the optimal point)
- iv. What is Alice's utility at this point?

2. Suppose Alice's income falls to \$60. [6 pts]

- i. Write the equation for Alice's new budget line. Illustrate this graphically on the graph from problem 1, part i.
- ii. What is the new optimal bundle of X and Y?
- iii. Is Y a normal or inferior good?
- iv. What is Alice's utility at this point?
- v. Construct Alice's Engel curve for good Y using these 2 levels of income.
- vi. When her income changes from \$120 to \$60, what is Alice's income elasticity of demand in this region?

3. Now, suppose the price of good Y decreases from \$6 to \$3, but her income stays at the original level of \$120. [6 pts]

- i. Write the equation for Alice's new budget line. Draw this graphically on the same graph from problem 1, part i.
- ii. What is the new optimal bundle of X and Y?
- iii. Is Y a giffen or a non-giffen good?
- iv. What is Alice's utility at this point?
- v. Construct Alice's linear demand curve for good Y from these 2 points. Derive the equation and illustrate it graphically. (Note: this curve has different axes, so you will need to use a different graph than that from part i.)
- vi. What is Alice's price elasticity of demand for good Y? Is Alice's demand elastic or inelastic?

4. Consider the following: [4 pts]

- i. Can a good have both a downward sloping Engel curve and a downward sloping demand curve? Why or why not?
- ii. Can a good have both an upward sloping Engel curve and an upward sloping demand curve? Why or why not?

5. Fill in the table below. [6 pts]

Demand				Total Cost		
Quantity	Price	Total Revenue	Marginal Revenue	Quantity	Dollars	Marginal Cost
0 units	\$35/unit		-----	0 units	\$0	-----
1	30			1	4	
2	25			2	11	
3	20			3	21	
4	15			4	34	
5	10			5	50	

6. The following questions refer to the table in part 5. [4 pts]

- i. What is the total profit from selling two units?
- ii. According to the equimarginal principle, how many units should the firm produce in order to maximize its profit?
- iii. Suppose, that in addition to its per-unit costs listed above, a flat fee of \$10 is imposed on the seller. Will this seller continue to produce? If so, how many units will he produce? Why?

7. Suppose you have 24 hours per day that you can allocate between leisure and working at a wage of \$2 per hour. [10 pts]

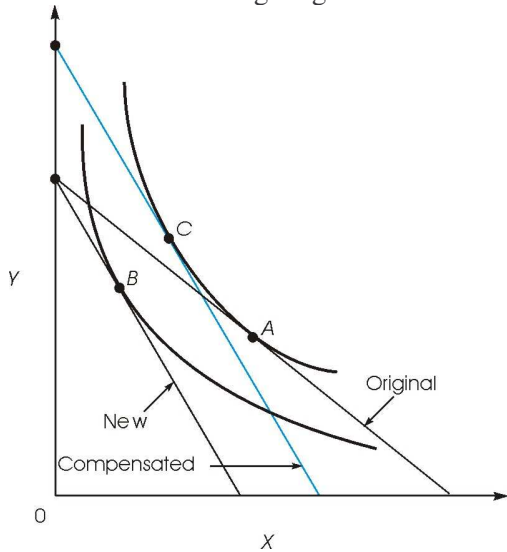
- i. Draw your budget constraint between “leisure hours” on the horizontal axis and “income” on the vertical axis and draw an indifference curve that illustrates your optimal point. Label this point A. Be sure to label your intercepts. (1 pt)

Suppose your wage increases to \$3 per hour.

- ii. Draw your new budget line in the diagram above. [1 pt]
- iii. According to the substitution effect, should your wage hike increase or decrease your leisure time? Why? [2 pts]
(Hint: What is the price of an hour of leisure? Has the price of leisure gone up or down? What does this mean in terms of the substitution effect?)
- iv. If leisure is a normal good, will the income effect of this wage hike increase or decrease your leisure time? Why? [2 pts]
(Hint: Are you poorer or richer due to the wage change? What does this mean in terms of the income effect?)
- v. On your indifference curve diagram above, decompose the effect of the wage increase into a substitution effect and an income effect assuming leisure is a normal good and that the substitution effect is larger than the income effect of the wage increase. (Note: label and use the points A, B and C to illustrate the two effects) Has your leisure time increased or decreased due to this wage hike? [4 pts]

8. Multiple Choice [10 pts]:

Refer to the following diagram for the next 4 problems



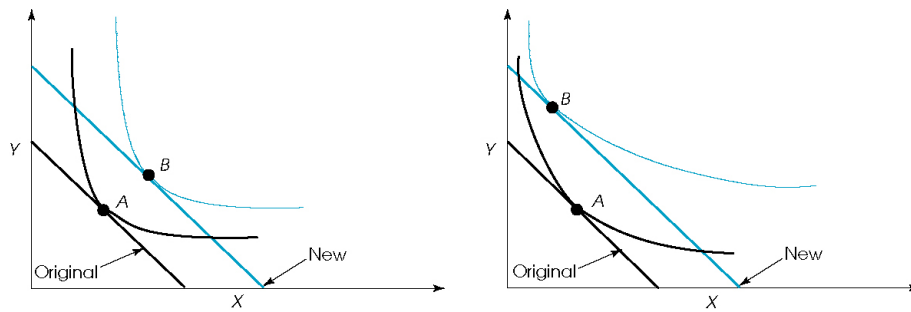
- i. When the budget line shifts from the “Original” to the “New”, the price of ____.
 - A. X increases.
 - B. X decreases
 - C. Y increases
 - D. Y decreases

- ii. When the price change in the previous question occurs, the actual consumption of good X changes from ____ to ____.
 - A. A to B
 - B. A to C
 - C. B to C
 - D. C to A
 - E. B to A

- iii. The move from C to B with respect to the quantity of good X refers to the
 - A. Substitution Effect
 - B. Income Effect
 - C. Can't tell

- iv. In this case, X is a _____ good.
 - A. Giffen
 - B. Inferior
 - C. Normal
 - D. Leontief

Refer to the following graphs for the next two questions:



v. The good depicted in (A) is:

- A. an inferior good, so the slope of the Engel curve for this good is positive
- B. an inferior good, so the slope of the Engel curve for this good is negative
- C. a normal good, so the slope of the Engel curve for this good is positive
- D. a normal good, so the slope of the Engel curve for this good is negative

vi. The good depicted in (B) is:

- A. an inferior good, so the slope of the Engel curve for this good is positive
- B. an inferior good, so the slope of the Engel curve for this good is negative
- C. a normal good, so the slope of the Engel curve for this good is positive
- D. a normal good, so the slope of the Engel curve for this good is negative

vii. Whenever a worker's marginal product is greater than the average product, adding that worker causes average product to:

- A. rise
- B. fall
- C. remain constant
- D. change unpredictably

viii. If a firm's total cost associated with producing 10 units is \$100 and his fixed costs are \$10. Then the firm's average variable cost of producing 10 units is:

- A. \$10
- B. \$90
- C. \$9
- D. \$1

ix. As increasing amounts of a good are produced, the marginal cost of production tends to

- A. rise
- B. fall
- C. remain constant
- D. change unpredictably

x. Costs that are independent of the firm's level of output are called

- A. fixed costs.
- B. marginal costs.
- C. opportunity costs.
- D. sunk costs.