Monmouth COLLEGE

- Name: _____
- Date: _____
- Section: _____

ECON 300: Intermediate Price Theory

Quiz #3

Fall 2024

INSTRUCTIONS:

- Please read all questions carefully before you begin answering.
- Answer all questions in the spaces provided on the question sheet.
- This quiz consists of 7 pages, including this one. There are a total of 4 problems with a total of 19 subquestions.
- This is a closed-book quiz. Please remove all materials from the top of the desk and take any necessary items from your bags before the exam begins.

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Problem 1. Definitions **(5 Points Each)**

Select FOUR items on the list of items below, and provide a definition of the items that you chose.

- Budget Set
- Indifference Curve
- Marginal Rate of Substitution
- Utility Function
- Market (Objective) Rate of Exchange
- Marginal Utility

1.A. Item #1: _____

1.B. Item #2: _____

1.C. Item #3: _____

1.D. Item #4: _____

Problem 2. True / False **(5 Points Each)**

Determine whether the following statements are either `TRUE` or `FALSE`. If you deem that the statement is `TRUE`, there is no need to justify your answer. If you deem that the statement is `FALSE`, you MUST justify your verdict by providing an explanation.

2.A. When $\frac{MU_x}{MU_y} > \frac{P_x}{P_y}$, one should purchase more units of good x, and less units of good y.

2.B. The slope of the budget line represents "units of good y that the consumer is willing to give up for 1 extra unit of good x," and the slope of the indifference curve represents the "units of good y that the consumer must give up for 1 extra unit of good x."

2.C. When $\frac{MU_x}{P_x} < \frac{MU_y}{P_y}$, one should purchase more units of good x, and less units of good y.

2.D. You can always calculate a consumer's marginal rate of substitution, as long as the consumer's preferences are rational.

Problem 3. The Utility Maximization Problem **(5 Points Each)**

Suppose that a consumer is participating in a market with two goods: good x and good y. The consumer's utility function $u(\cdot)$ is given as follows:

$$u(x, y) = 5x^2y^3$$

The consumer's budget is \$100, and the unit price of good x is \$4, and the unit price of good y is \$2.

3.A. Find the marginal utility of good x and good y, respectively.

- $MU_x =$
- $MU_y =$

3.B. Assuming $MU_x = 2y$ and $MU_y = 3x$, find the expression for this consumer's marginal rate of substitution between good x and good y. From now on until the final question in problem 3, use this MRS whenever you find that you need to use the MRS to solve a question.

- $MRS_{xy} =$

3.C. Find the formal expression for the consumer's budget constraint.

3.D. Find the optimal ratio of goods x and y necessary for the consumer to maximize utility.

3.E. Find the consumer's optimal bundle (x^*, y^*) that maximizes utility.

Problem 3. The Utility Maximization Problem (continued) **(5 Points Each)**

We continue from the previous setup, where a consumer is participating in a market with good x and good y and utility function $u(\cdot)$:

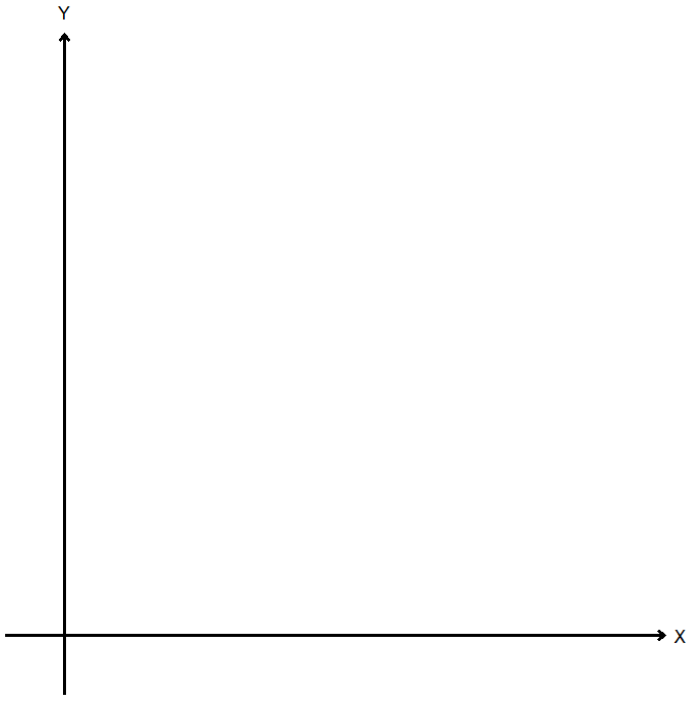
$$u(x, y) = 5x^2y^3$$

The consumer's budget is \$100, and the unit price of good x has now been increased to \$8 (from $P_x = 4$ initially), and the unit price of good y remains at \$2.

3.F. Find the optimal ratio of goods x and y necessary for the consumer to maximize utility under the new prices.

3.G. Find the consumer's optimal bundle (x^*, y^*) that maximizes utility under the new prices.

3.H. In the empty chart below, plot the consumer's original and new utility maximization problem. The items required for this problem is listed below:



- The original (from page 5) and new (from page 6) budget lines.
- The original and new indifference curve that passes through the optimal bundles.
- Labels for the x and y intercepts for both budget constraints.
- The original and new utility maximizing bundles of goods.

Problem 4. The Utility Maximization Problem: Perfect Substitutes (5 Points Each)

Suppose that a consumer is participating in a market with two goods: good x and good y. The consumer's utility function $u(\cdot)$ is given as follows:

$$u(x, y) = 2x + 3y$$

The consumer's budget is \$100, and the unit price of good x is \$4, and the unit price of good y is \$2.

4.A. Find the marginal utility of good x and good y, respectively.

- $MU_x =$
- $MU_y =$

4.B. Find the optimal ratio of goods x and y necessary for the consumer to maximize utility.

4.C. Find the consumer's optimal bundle (x^*, y^*) that maximizes utility.

- Original Score: _____
- Recovered Score: _____
- Original Date: _____
- Recovered Date: _____