Monmouth COLLEGE

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

ECON 300: Intermediate Price Theory

Problem Set #4 - Part #1

Fall 2024

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Problem 1. Comparative Statics of the UMP: Price

Suppose that a consumer's utility function $u(\cdot)$ over two goods x and y is given as:

$$u(x, y) = 2xy^4$$

The consumer's budget is \$120, and the unit price of good x is \$1, and the unit price of good y is \$4.

1.A. Find the marginal utility of good x and y.

1.B. Find the marginal rate of substitution between goods x and y.

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

1.D. Find the optimal ratio of goods x and y the consumer should purchase to maximize their utility.

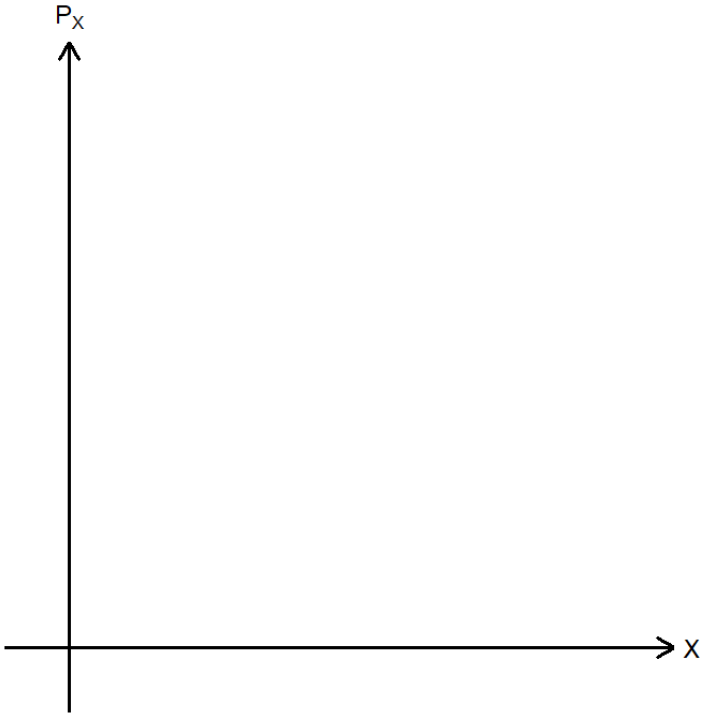
1.E. Find the optimal bundle that the consumer should purchase to maximize their utility.

Problem 1. Comparative Statics of the UMP: Price (continued)

1.F. Suppose that the price of good x increased from \$1 to \$2. Find the optimal bundle that the consumer should purchase to maximize their utility under this updated price of good x.

1.G. Suppose that the price of good x increased from \$2 to \$4. Find the optimal bundle that the consumer should purchase to maximize their utility under this updated price of good x.

1.H. Using your answers from `1.E`, `1.F`, and `1.G`, approximate the consumer's demand curve in the empty chart below.



Problem 2. Comparative Statics of the UMP: Income

Suppose that a consumer's utility function $u(\cdot)$ over two goods x and y is given as:

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

The consumer's budget is \$60, and the unit price of good x is \$1, and the unit price of good y is \$2.

2.A. Find the marginal utility of good x and y.

2.B. Find the marginal rate of substitution between goods x and y.

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

2.D. Find the optimal ratio of goods x and y the consumer should purchase to maximize their utility.

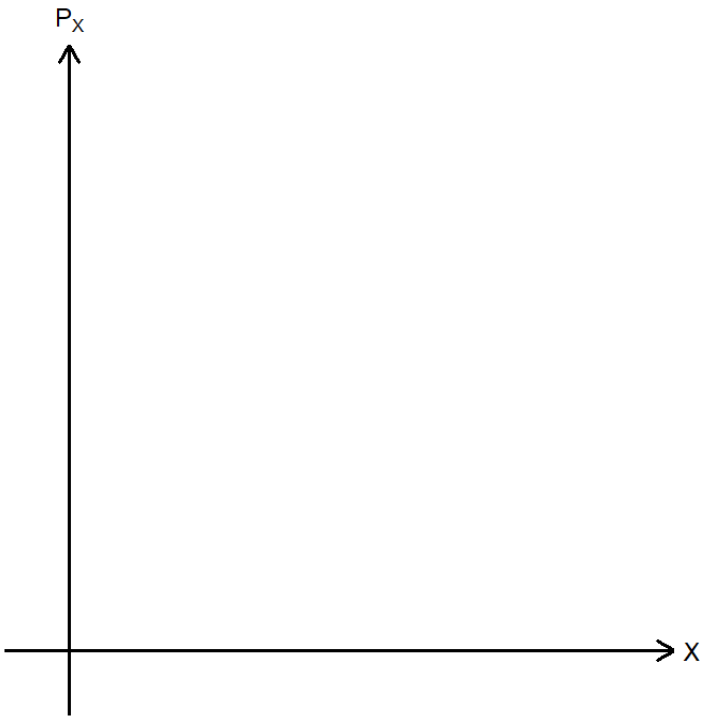
2.E. Find the optimal bundle that the consumer should purchase to maximize their utility.

Problem 2. Comparative Statics of the UMP: Income (continued)

2.F. Suppose that the consumer's income increased from \$60 to \$90. Find the optimal bundle that the consumer should purchase to maximize their utility.

2.G. Suppose that the consumer's income increased from \$90 to \$120. Find the optimal bundle that the consumer should purchase to maximize their utility.

2.H. Using your answers from `2.E`, `2.F`, and `2.G`, approximate how the consumer's demand curve reacts to the change in consumers' income in the empty chart below.



Problem 3. Deriving the Demand Curve

Suppose that a consumer's utility function $u(\cdot)$ over two goods x and y is given as:

$$u(x, y) = x^2 y^4$$

The consumer's budget is M, and the unit price of good x is P_x, and the unit price of good y is P_y.

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

3.B. Find the marginal rate of substitution between goods x and y.

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

3.D. Find the optimal ratio of goods x and y the consumer should purchase to maximize their utility.

3.E. Find the expression for the consumer's demand of good x.

- Score: _____
- Extra Credit: _____