

EC701 Adv Micro I: Homework Problem Set 1

The following homework assignment is to be submitted via email to Isaiah Boyer at icb00014@mix.wvu.edu with a “cc” to me at roger.congleton@mail.wvu.edu. The answers are due **1 hour before class time on the day that we begin the next block of material** in the course. They should be typed up and emailed to Isaiah in Word. (This will take a bit of time, but it is good practice.) Isaiah will grade them and I will return them in class shortly after he finishes grading them.

- (1) Suppose that Al is a net benefit maximizer. Suppose that her net benefits (N) are simply $N = 4Q^{.5} - PQ$ and that price (P) is 1 dollar/unit. Find Al's net benefit maximizing quantity.
- (2) Suppose that Al is a net benefit maximizer. Suppose that her net benefits are $N = 20Q^{.5} - PQ$, find Al's demand function for this good.
- (3) Suppose that Al has the utility function $U = X^{.5}Y^{.5}$ and has \$50 to allocate between goods X and Y. The price of X is 5\$/unit and the price of Y is 10\$/unit. Find the quantities of X and Y that Al will purchase.
- (4) Suppose that Al has the utility function $U = X^{.75}Y^{.25}$ and has \$50 to allocate between goods X and Y. The price of X is 5\$/unit and the price of Y is also 5\$/unit. Find the quantities of X and Y that Al will purchase.
- (5) Suppose that Al has the utility function $U = X^{.5}Y^{.5}$ and has \$100 to allocate between goods X and Y. The price of Y is 5\$/unit. Find Al's demand function for good X.
- (6) Suppose that Al's total benefit function ($B = b(Q)$) is strictly concave. Characterize Al's demand curve for this good and determine whether it is upward or downward sloping. Then explain the intuition behind your result by referring to the various mathematical steps taken. (Hint, you'll need to use the implicit function and implicit function differentiation rule to do this.)