Intermediate Microeconomics Assignment 3

Due on November 28, 2021

Name Student ID

1 Consider the market described by page 19 in Lecture 6. To simplify, let's assume that there is only one buyer and one seller in that market. The buyer's utility is quasi-linear: $\sqrt{x} + y$ (the price of y is normalized to 1, the price of x is denoted as p, and let's stick with interior solutions). The seller's cost function is $c(x) = x^2$. The market is assumed to be perfectly competitive. In the lecture notes, we compute total surplus by aggregating consumers' utility and sellers' profits directly. Now try to compute consumer surplus, producer surplus and total surplus by using the demand-supply diagram.

(1) If the equilibrium price is p, compute consumer surplus, producer surplus and total surplus. Hint: you should solve the UMP of the consumer, and profit-maximization of the seller, then derive the demand and supply curve of the market (for good x).

(2) Assume that the government imposes an *ad valorem* tax on sellers, i.e., if the buyer pays p to the seller, then the seller pays τp to the government where τ is the tax rate (percentage). Compute the size of deadweight loss as a function of τ. Show that the size of deadweight loss is increasing in τ.

(3) Compared to the approach that is adopted in our lecture notes, are the two approaches equivalent?

2 Consider an exchange economy with two persons and two-goods. Alice's utility is $U_A = x^a y^{1-a}$; Bob's utility is $U_B = x^b y^{1-b}$. Assume that each person is endowed with 1 unit of x and 1 unit of y. Solve the Walrasian equilibrium.

3 Consider an exchange economy with two persons and two-goods. Alice's utility is $U_A = \min\{x, y\}$; Bob's utility is $U_B = xy$. Assume that Alice endowed with 2 units of x and 8 units of y; whereby Bob is endowed with 8 units of x and 2 units of y. Solve the Walrasian equilibrium.

4 Replicate the two excises of the last two examples (page 50 — page 53) in the Lecture 6.