1. Assume that labor supply is given by \( L^S = w \) and that labor demand is given by \( L^D = 60 - w \).

(a) Find the measure of excess burden for a $2 per hour tax on wages employees receive.

(b) Now assume the tax goes from $2 to $4. Find the additional excess burden from this tax increase.

(c) How do the two numbers you just found compare?

(d) Draw this market, the interventions (taxes), and point out the deadweight losses.

2. Consider an intertemporal choice problem with utility function

\[
\max_{\{c_1, c_2\}} U(c_1, c_2) = c_1^{\frac{1}{5}} + c_2^{\frac{1}{3}}
\]

The individual is endowed with \( I_1 = 50,000 \) and \( I_2 = 10,000 \). The rate of return is \( r = 0.075 \).

(a) Set up and solve the individual’s optimization problem. Solve for the optimal level of savings/debt, and consumption in both periods.

(b) Graph the intertemporal budget constraint, denote maximum consumption levels, and the endowment point, and denote the optimal choice and indifference curve.

(c) Suppose “savings” implies any capital investment, the return on which is taxed at rate .25. Suppose “debt” denotes a mortgage loan, the interest on which is tax deductible (at the same rate). Solve the post-tax optimal savings and consumption levels, plot the new budget constraint on the same graph, above, and denote the new optimal choice.

(d) Discuss the resulting income and substitution effects associated with part c.

3. Suppose the demand for good X can be represented by the following equation: \( Q^x_d = 22 - \left(\frac{1}{4}\right) P_x \). Furthermore, suppose that the demand for good Y can be represented by \( Q^y_d = 50 - P_y \). The supply of both goods is perfectly elastic, so all the incidence falls on the consumers. The prices of both goods are equal to $10. Suppose that an ad valorem tax is placed on both goods. Good Y is taxed at a rate of 5%. To ensure that the inverse elasticity rule holds, what must be the rate at which good X is taxed? (Hint: Elasticity at a given price is found using the formula \( \eta^r_D = -(1/S_i)(P_i/Q_i) \), where \( S_i \) is the slope of the demand curve for good \( i \), \( Q_i \) is the quantity demanded of good \( i \), and \( P_i \) is the price of good \( i \).)

4. Describe the Inverse Elasticity Rule in words? Why not tax all goods at the same rate?