The homework is due on Wednesday, October 21 at 4pm. No partial credits.

**Question 1** In the last homework we determined the demand function, the indirect utility function, the expenditure function, and Hicksean demand for \( u(x_1, x_2) = (x_1^{-1} + x_2^{-1})^{-1} \).

Now suppose that prices are \( p_1 = 4 \), \( p_2 = 4 \), and \( I = 40 \). Then the price of good 1 increases to \( p_1 = 6 \).

Determine the Slutsky Substitution and Income Effect.

**Question 2** Same as Question 1, except now determine the Hicks Substitution and Income Effect.

**Question 3** Consider the utility function \( u(x_1, x_2) = x_1 x_1 \). We determined the demand function, the indirect utility function, the expenditure function, and Hicksean demand in the lecture.

Suppose that prices are originally \( p_1 = 2 \), \( p_2 = 2 \) and income is \( I = 100 \). Then the government introduces an excise tax of 2 Dollars per unit on good 1, raising the price to \( p_1 = 4 \).

(a) Determine the governments tax revenue.

(b) Determine the size of a lump-sum tax at prices \( p_1 = 2 \), \( p_2 = 2 \) which would result in the same after tax utility to the consumer as the excise tax (\( \text{Hint: You can solve this question by using the expenditure functions} \)).

(c) The difference between your answers in (a) and (b) is a measure for the deadweight loss of taxation. Determine this deadweight loss.