(2006 Midterm) 3. [20 points] Based on empirical analysis, you have the following information about a typical poor consumer's demand for heating oil:

Own price elasticity of demand:	-2
Wealth elasticity of demand:	10
Current price:	10
Current consumption:	120
Current wealth:	12,000

For the coming heating season, the government is expecting an increase in the price of heating oil to 12. It is interested in determining how much to increase public assistance so that the poor people can maintain their current standard of living after the increase in the price of heating oil.

(3a) According to economic theory, how should the government determine the required increase in public assistance? Briefly explain your answer. Be sure to relate it to the concepts studied in class.

(3b) Using the data provided above, estimate how much public assistance should be increased in order to maintain the poor consumers' standard of living.

[Parts c-e have been added for the purposes of section; they were not on the original exam.]
(3c) Now assume that the price increase was due to a tax. Calculate the deadweight loss of the tax using the concept from part b.

(3d) Calculate the Laspeyres Index for the price change. If we used the Laspeyres Index to compensate the consumer, how much would we increase public assistance? Explain the intuition behind the relationship between this value and the value you found in part (b).

(3e) Estimate the Paasche Index for the price change. If we used the Paasche Index to compensate the consumer, how much would we increase public assistance?

(2004 Midterm)

1. [30 points] Consider a two-commodity world and consumer with the following utility function:

$$u(x_1, x_2) = \left(x_1^{1/2} + x_2^{1/2}\right)^2$$

The prices of goods 1 and 2 are p_1 and p_2, respectively, and the consumer has initial wealth w.

a) State the consumer's utility maximization problem [3 points]
b) Will this consumer's Walrasian demand functions satisfy Walras' Law? Explain your answer? [3 points]
c) Derive the consumer's Walrasian demand functions and indirect utility functions. [12 points]
d) Suppose that the consumer has wealth w = 260. Initially, prices are (p_1,p_2) = (6,8). Suppose prices change to (p'_1,p'_2) = (5,12). What is the (exact) equivalent variation of this price change? [12 points]