

Do all 4 questions. All count equally.

1. Derive a consumer's Marshallian (uncompensated) and Hicksian (compensated) demand functions for all three commodities, if her preferences can be represented by the utility function

$$u(x_1, x_2, x_3) = x_1 + \ln x_2 + \ln x_3$$

(You may assume that her income is greater than  $2p_1$ .)

2. Derive the relationship (“Engel aggregation”) among a consumer's income elasticities of demand for the commodities which she consumes.

3. If person 1's utility-of-wealth function can be written  $g[u(W)]$ , where  $u(W)$  is person 2's utility-of-wealth function, and  $g(\cdot)$  is an increasing, concave function, which person is more risk averse? What is the relationship between the two people's coefficients of absolute risk aversion?

4. Derive the cost function for a firm with a production function

$$f(x_1, x_2) = \ln x_1 + \ln x_2$$