

due : Wednesday January 26    before class

Do all 5 questions. Each counts 20%.

1. Are the preferences represented by the following utility function strictly monotonic? Convex?

$$u(x_1, x_2) = (x_1)^2 + (x_2)^2$$

In each case, explain briefly.

2. Are the preferences represented by the following utility function strictly monotonic? Convex?

$$u(x_1, x_2, x_3) = x_1x_2 + x_3$$

In each case, explain briefly.

3. Solve for a person's Marshallian demand functions, if her preferences can be represented by the utility function

$$u(x_1, x_2) = -\exp(-x_1) - \exp(-x_2)$$

(where "exp" is the exponential function,  $\exp a \equiv e^a$ ).

4. If a person's preferences can be represented by the direct utility function

$$u(x_1, x_2) = 100 - \frac{1}{x_1} - \frac{1}{x_2}$$

find the person's Marshallian demand functions for each good, her indirect utility function, her Hicksian demand function, and her expenditure function.

5. A person's preferences are described as **quasi-linear** if they can be represented by the utility function

$$u(x_1, x_2, \dots, x_n) = x_1 + g(x_2, x_3, \dots, x_n)$$

for some increasing, concave function  $g : R^{n-1} \rightarrow R$ .

If a person's preferences are quasi-linear, what is the income elasticity of demand for each good?

Explain briefly.