GS/ECON 5010   Assignment 1   F2008

due : Friday September 26   8:30 am

Do all 5 questions. Each counts 20%.

1. Are the preferences described below strictly monotonic? Convex? Explain briefly.

The two goods are avocado and bread. Each avocado has 2 grams of protein and 500 calories. Each piece of bread has 1 gram of protein and 100 calories. The person calculates the total number of grams of protein, and the total number of calories, in each bundle. He prefers a bundle with A avocadoes and B pieces of bread to another bundle containing a avocadoes and b pieces of bread if and only if the bundle (A, B) gives her more protein per calorie than the bundle (a, b). (If the two bundles have the same protein per calorie, then he is indifferent between them.)

2. Are the preferences represented by the utility function below strictly monotonic? Convex? Explain briefly.

$$u(x_1, x_2) = \frac{x_1 x_2}{x_1 + x_2} \quad \text{if} \quad (x_1, x_2) \neq (0, 0)$$
$$u(0, 0) = 0$$

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

$$u(x_1, x_2, x_3) = \ln{(x_1)} + 2\sqrt{x_2 x_3}$$

(when $\sqrt{p_2 p_3} < m$).

4. Calculate a person's Marshallian demand functions, and her expenditure function, if her direct utility function is
$$u(x_1, x_2, x_3) = 2(\sqrt{x_1 x_2} + \sqrt{x_1 x_3})$$

5. Calculate the expenditure function for a person whose direct utility function is

$$u(x_1, x_2) = 10 - \frac{1}{\sqrt{x_1}} - \frac{1}{\sqrt{x_2}}$$