

due : Monday October 2    before class (3.00 pm)

Do all 5 questions. Each counts 20%.

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

In comparing any two bundles  $\mathbf{x}$  and  $\mathbf{z}$ , the person strictly prefers bundle  $\mathbf{x}$  to bundle  $\mathbf{z}$  if  $x_1 + x_2 > z_1 + z_2$ , and strictly prefers bundle  $\mathbf{z}$  to bundle  $\mathbf{x}$  if  $z_1 + z_2 > x_1 + x_2$ .

If  $x_1 + x_2 = z_1 + z_2$ , the person strictly prefers bundle  $\mathbf{x}$  to bundle  $\mathbf{z}$  if  $x_1 > z_1$ , and strictly prefers bundle  $\mathbf{z}$  to bundle  $\mathbf{x}$  if  $z_1 > x_1$ .

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

The person likes more of each good, but she also wants the quantities of the 2 goods to be as close as possible. In particular, her utility function can be represented as the sum  $x_1 + x_2$  of the quantities of goods 1 and 2, **minus**  $b$  times the absolute value of the **difference**  $|x_1 - x_2|$  between the quantities of the two goods, where  $0 < b < 1$ .

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

$$u(x_1, x_2, x_3) = \log x_1 + \log x_2 + \sqrt{x_3} \quad ?$$

4. What quantities of goods 1 and 2 will a person demand if her preferences can be represented by the utility function

$$u(x_1, x_2) = x_1 x_2$$

if her income is  $y$ , the price of good # 1 is \$2, and if good # 2 has the following non-linear price schedule : the first 12 units of good # 2 cost \$4 each, and each additional unit of good # 2 (above 12) costs \$1 each?

5. Derive the indirect utility function, expenditure function, and Hicksian demand function for the preferences

$$u(x_1, x_2) = \min [x_1(x_2)^2, (x_1)^2 x_2]$$