

Midterm Exam October 24 2008 8:30 – 9:50 am

Do all 4 questions. All count equally.

1. Prove Roy's Identity (the theorem relating Marshallian demand functions and the indirect utility function).

2. Is it possible that the following data represent the behaviour of a consumer with well-behaved preferences? In the table,  $p_i^t$  is the price of good  $i$  in year  $t$  and  $x_i^t$  is the quantity consumed of good  $i$  in year  $t$ .

$t$	$p_1^t$	$p_2^t$	$p_3^t$	$x_1^t$	$x_2^t$	$x_3^t$
1	1	1	1	10	2	8
2	3	1	3	5	12	4
3	1	2	1	8	1	10
4	1	1	3	8	6	7

3. An expected utility maximizer has utility-of-wealth function

$$U(W) = 200 - \frac{1}{W}$$

Calculate this person's risk premium for a gamble which offers a wealth of  $2X$  with probability 0.5, and of a wealth of  $(0.5)X$  with probability 0.5, where  $X$  is some positive number.

4. What is the cost function  $C(\mathbf{w}, y)$  for a firm for which the production function is

$$f(x_1, x_2) = \ln(x_1 + 1) + x_2$$

where  $x_i$  is the quantity employed of input  $i$ ?