

due : Wednesday October 13 before class

Do all 5 questions. Each counts 20%.

1. The table below indicates the prices \mathbf{p}^t of three commodities, at 4 different times t , and the consumption bundle \mathbf{x}^t actually chosen by the consumer at each of the four times.

What can be said about the consumer's preferences over the 4 bundles \mathbf{x}^t ?

t	p_1^t	p_2^t	p_3^t	x_1^t	x_2^t	x_3^t
1	1	1	5	6	10	4
2	5	1	2	2	15	3
3	2	5	2	5	10	5
4	5	4	1	4	10	10

2. A person is considering betting \$B on the toss of a fair coin, with the bet paying a prize of \$P if the coin lands "heads". If her utility-of-wealth function is

$$U(W) = \frac{1}{\alpha} W^\alpha \quad \alpha < 1 \quad \alpha \neq 0$$

how high must the prize P be in order for her to be willing to bet \$B? How does the size of this required prize vary with the size of the bet, and with her wealth?

3. If a person's utility-of-wealth function is

$$U(W) \equiv \alpha W - \beta W^2$$

what must be the expected return on some gamble, if the person is just willing to accept the gamble?

4. If a person has an initial wealth of W , and faces a financial loss of L , which she expects will occur with probability π , how much insurance should she buy against that loss, if the price per dollar of insurance is p (not necessarily equal to π), and if her utility-of-wealth function is $U(W) = \ln W$?

5. If a production function $f(x_1, x_2)$ has the equation

$$f(x_1, x_2) = Ax_1 - b(x_1)^{1+\gamma}(x_2)^{-\gamma}$$

for positive parameters A , b and γ (for $(x_1/x_2) < (A/[b(1+\gamma)])^{1/\gamma}$), calculate the marginal product of each input, and the marginal rate of technical substitution. Does the production function exhibit decreasing, constant, or increasing returns to scale? Explain briefly.