

ECONOMIC PRINCIPLES, SPRING 2018
MIDTERM EXAM
DINO GERARDI
MARCH 22ND

You have two hours to complete this exam. Please answer the following three questions. Be sure to allocate your time in proportion to the points. Always justify your answers by providing a formal proof or a detailed argument. Good luck.

1. [30 points] Consider a consumer with the following utility function:

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

Suppose that the consumer's income is $y = 1$ and $p_2 = 2$. If the price of the first commodity changes from $p_1 = 2$ to p'_1 , the consumer's equivalent variation is equal to $-\frac{1}{3}$.

Find the value of p'_1 .

2. [40 points] Bob's utility depends on the state of the world and his level of wealth. The state is equal to 1 with probability $1/4$ and equal to 2 with probability $3/4$.

Bob's von Neumann-Morgenstern utility function is equal to

$$\sqrt{k+x} \text{ if the state is 1, and equal to } \sqrt{x} \text{ if the state is 2}$$

where x denotes Bob's level of wealth and k is a strictly positive number.

Bob's initial level of wealth is $w > k$.

Bob can invest some of his wealth in a bet that pays $4/3$ Euros (for every Euro invested) if the state is 2. The bet pays nothing if the state is 1.

How much is Bob going to invest in the bet? Why does he bet against his favored state?

3. [30 points] A firm uses n inputs to produce its output. Suppose that the prices of the inputs are fixed and equal to $\bar{w} = (\bar{w}_1, \dots, \bar{w}_n)$. The firm's supply function (given \bar{w}) is equal to

$$y(p; \bar{w}) = \sqrt{p}$$

where p denotes the price of the output.

Derive the firm's cost function $c(y; \bar{w})$.

$$\sqrt{\frac{1}{2+p}} \left(\sqrt{\frac{2}{p}} + \sqrt{\frac{p}{2}} \right) = \sqrt{\frac{2}{3}}$$

, Solution is: 6