Mid-term II Econ300, 9:30am (White) April 5, 2007

Name:

E-mail:

All questions must be answered on this test form!
For each question you must show your work and (or) provide a clear argument.
All graphs must be accurate to get credit.
If you need scratch paper, use the last page or the back of the test form.

Question 1 Mario has a small garden where he raises eggplants and tomatoes. He consumes some of these vegetables, and he sells some in the market. One week his garden yielded 160 pounds of eggplant and 120 pounds of tomatoes. The price of a pound of eggplant was \$3 and the price of a pound to tomatoes was \$2.

(a) Then *4 points*

The value of his endowment is .

(b) Suppose that his utility function is $u(x_e, x_t) = x_e x_t^2$, where x_e and x_t is the consumption of eggplants and tomatoes, respectively. Thus, MRS $= x_t/(2x_e)$. Then his optimal consumption is . *8 points*

$\boldsymbol{x_e =}$, $\boldsymbol{x_t =}$.

Question 2 A person's utility function is given by $u(x_1, x_2) = x_1 x_2^4$. Thus, the marginal rate of substitution is $\text{MRS} = x_2/(4x_1)$. Suppose that prices are $p_1 = p_2 = 2$. Determine the minimum income the person needs to afford a consumption that gives the person a utility of 8,192? *15 points*

The equation of the income offer curve is $\boldsymbol{x_2 =}$.

The expenditure minimizing consumption is

$\boldsymbol{x_1 =}$ $\boldsymbol{x_2 =}$.

The person needs \$.

Question 3 Joe has a credit card that charges an interest rate of 20% per year. This year he has 4,000 Dollars that he can spend. Next year he will have 13,440 Dollars. His utility function is $u(c_1, c_2) = \ln(c_1) + 0.9 \ln(c_2)$, where c_1 is consumption this year, and c_2 next year. His MRS is therefore $c_2/(0.9c_1)$.

15 points

Joe's consumption is $\boldsymbol{c_1 =}$, $\boldsymbol{c_2 =}$.

This year, Joe borrows \$

Suppose Joe's credit card has a credit limit of 2,000 Dollars, and he cannot get credit from any other source. Then

Joe borrows \$

Question 4 A person has 100 hours per week that can be allocated between leisure R and labor. The person's income from other sources is \$200. The utility function is given by $u(R, c) = Rc$, where c denotes consumption (the price of each unit of consumption is 1). Suppose that the wage is $w = 40$. The government introduces a tax of 50% on labor income. Then *15 points*

The person's labor supply *before* the tax is introduced is $\boxed{}$

The person's labor supply *after* the tax is introduced is $\boxed{}$

Question 5 A person has 120 hours per week that can be allocated between leisure R and labor. The person has no income from other sources. The utility function is given by $u(R, c) = Rc$, where c denotes consumption (the price of each unit of consumption is 1). Suppose that the wage is $w = 22.50$ and that the person must pay a tax of \$12.50 per hour of labor to the government. Thus, the after-tax wage is $w = 10$. At this after-tax wage the person works 60 hours and the optimal consumption is $c = 600$. Thus, utility is 36,000. We want to determine the deadweight loss from the income tax. *15 points*

To do this, determine R and c that minimize the cost of obtaining the after-tax utility of 36,000 when $w = 22.50$ (i.e., if labor income were not taxed).

$\boldsymbol{R} =$, $\boldsymbol{c} =$

The value of this consumption at prices $w = 22.50$ and 1 is | \$ |

Thus, the loss to the person is

Recall that the loss to the consumer is the difference between the right-hand side of the before-tax budget constraint and the value of (R, c) computed above. The deadweight loss of taxation is the difference between the tax revenue and loss to the consumer.

Thus, the deadweight loss is | % | of the tax revenue.

Question 6 Suppose a person has perfect substitutes preferences given by $u(x_1, x_2) = x_1 + x_2$. Currently, prices are $p_1 = 5$, $p_2 = 2$. The person's income is $m = 200$. However, the government introduces a tax of 200% on good 2, thereby raising the price to $p_2 = 6$. Then *15 points*

After tax utility is

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In order to obtain the after-tax utility at before-tax prices ($p_1 = 5$, $p_2 = 2$) the person's income would have to be $\boldsymbol{m =}$.

Thus, the deadweight loss generated by the tax is $\boxed{}$.

The government's tax revenue is $\boxed{}$.

Question 7 A person's Bernoulli utility function is $\ln(x)$. The person has an income of 50 Dollars, and considers buying a lottery ticket for 1 Dollar. The payoffs of the lottery are as follows:

1. Grand prize: 2,000 Dollars, with probability 1:10,000.
2. Second prize: 10 Dollars with probability: 1:100.
3. Third prize: 1 Dollar with probability 1:5.

13 points

The expected utility from playing the lottery is $\boxed{}$.

The lotteries' certainty equivalent is $\boxed{}$. Thus, playing the lottery is equivalent to losing $\boxed{}$ cents with certainty.

Scratch Paper: Not graded