Name:

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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.

Question 1 A utility function is given by $u(x_1, x_2) = -(1/x_1) - (1/x_2)$. Suppose that prices are $p_1 = 4$, $p_2 = 1$. Then the equation of the income offer curve is *10 points*

$x_2 =$

Question 2 The utility function

$$u(x_1, x_2) = \frac{1}{0.4^{0.4}0.6^{0.6}} x_1^{0.4} x_2^{0.6}$$

generates demand functions

$$x_1(p_1, p_2, I) = \frac{0.4I}{p_1}, \quad x_2(p_1, p_2, I) = \frac{0.6I}{p_2}.$$

Then the indirect utility function is given by *4 points*

$v(p_1, p_2, I) =$

The expenditure function is *4 points*

$e(p_1, p_2, u) =$

and the Hicksean demand functions are *4 points*

$h_1(p_1, p_2, u) =$ $\qquad\qquad$, $h_2(p_1, p_2, u) =$

Question 3 A utility function is given by $u(x_1, x_2) = x_1 + \ln x_2$. Suppose that prices are $p_1 = 2$, $p_2 = 1$ and income is I. Specify the utility maximization problem in the box below *3 points*

Thus, the Lagrangean is given by (specify *all* constraints for the Lagrangean. Also, the Lagrangean must be written in such a way that the multipliers are all greater or equal to zero). *3 points*

The first order conditions are *4 points*

$\frac{\partial \mathfrak{L}}{\partial x_1}$:

$\frac{\partial \mathfrak{L}}{\partial x_2}$:

Question 4 Income offer curves and indifference curves are depicted below. Originally price are $p_1 = 4$, $p_2 = 1$ and income is $I = 40$. Then the price of good 2 increases to $p_2 = 4$. Determine graphically the Hicks and the Slutzky substitution and income effect.

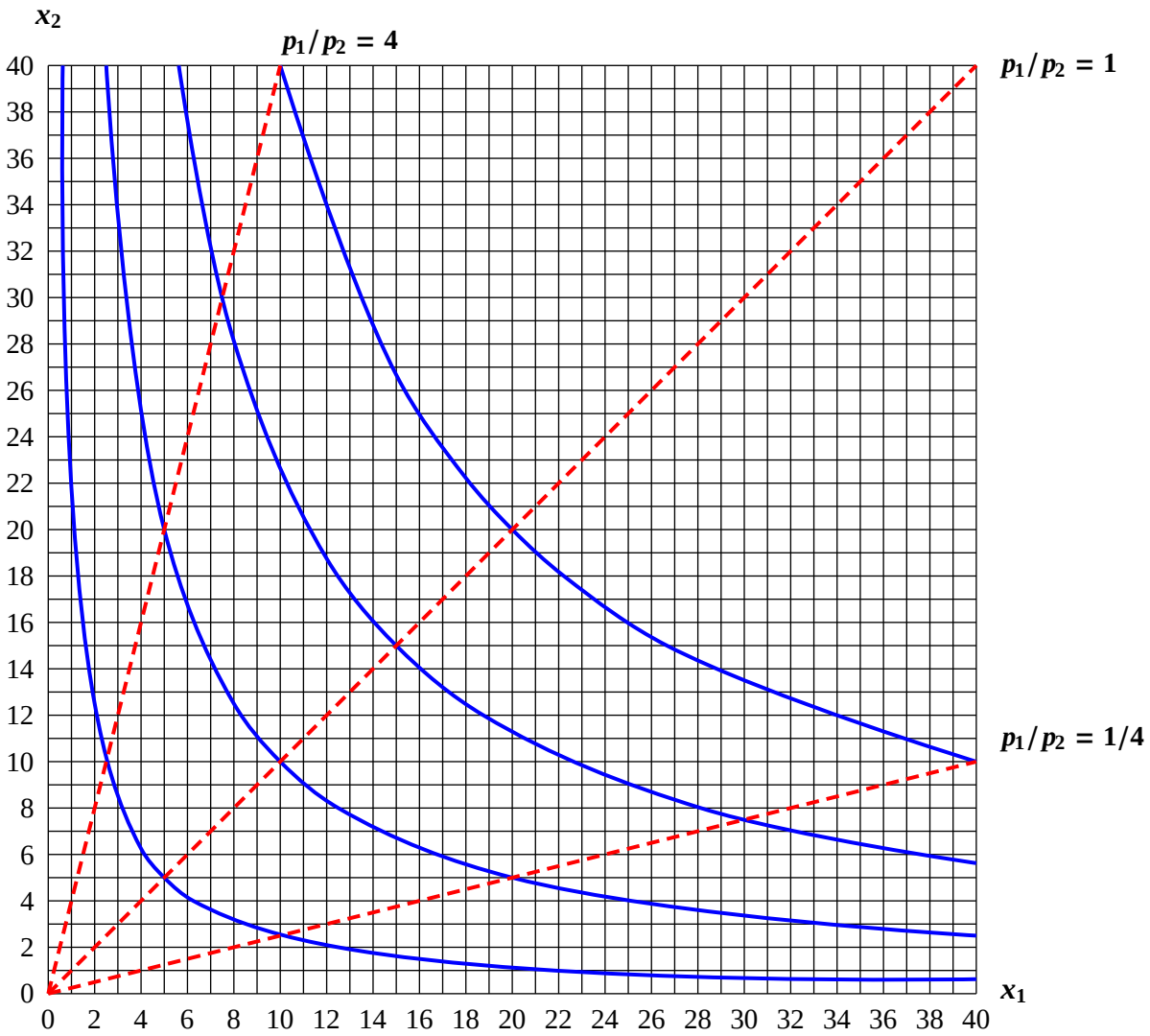
12 points

The Slutzky substitution effect for goods 1 and 2 is $\Delta^s x_1 =$ $\Delta^s x_2 =$

The Slutzky income effect for goods 1 and 2 is $\Delta^I x_1 =$ $\Delta^I x_2 =$

The Hicks substitution effect for goods 1 and 2 is $\Delta^s x_1 =$ $\Delta^s x_2 =$

The Hicks income effect for goods 1 and 2 is $\Delta^I x_1 =$ $\Delta^I x_2 =$



Question 5 A person's utility function is given by $u(L, c) = L^2 c$, where L is leisure and c is consumption. The person's income is derived from work. I.e., if ℓ is the number of house the person works per day, then $L = 24 - \ell$ corresponds to leisure.

(a) Suppose the hourly wage is $w = 10$. Then, the person's maximum utility is . *5 points*

(b) Now suppose that the government introduces an income tax of 40%. Thus, the person's after tax income is $w = 6$ and the government receives 4 Dollars in tax revenue for each hour worked. However, at the same time the government pays a lump sum subsidy to the the consumer such that he/she is at the pre tax utility level that you determined in (a). *7 points*

Tax revenue is:

The lump sum subsidy is:

The deadweight loss is:

Note: The solutions will not be integers.

Question 6 Suppose preferences are given by $u(x_1, x_2) = 2\sqrt{x_1 x_2}$, which yields the indirect utility function $v(p_1, p_2, I) = I/\sqrt{p_1 p_2}$, and the expenditure function $e(p_1, p_2, u) = u\sqrt{p_1 p_2}$. Suppose prices are $p_1 = 1$, $p_2 = 4$ and income is $I = 60$. Then the price of good 1 increases to $p_1 = 9$. Determine the compensating and the equivalent variation associated with the price change. *12 points*

The compensating variation is:

The equivalent variation is:

Question 7 Suppose a person's Bernoulli utility function is given by $u(x) = \ln(x)$. The person has 100 Dollars to invest. There are two investments available: (a) A riskless asset that pays an interest rate of 0%. A risky assets that that either pays 40% with probability 0.6 or -40% with probability 0.4.

(a) Suppose the person invests α Dollars into the risky asset $100 - \alpha$ Dollars into the riskless asset. Specify the person's expected utility: *5 points*

(b) Determine the optimal portfolio choice of α analytically. Note that α is not restricted to be between 0 and 100. *7 points*

$\alpha =$

Question 8 A person has mean variance preferences of the form $10E[X] - \text{Var}[X]$, where X is the random variable that describes the portfolio return.

Suppose the person has 100 Dollars. He invests α Dollars in a risky asset with mean return 1.6 and a variance of 0.1. The remainder $(100 - \alpha)$ is invested in a riskless asset with return 1.1.

The optimal α =

10 points

Question 9 A person has 10,000 Dollars of wealth. He/she has to opportunity to make an investment which has an initial cost of 6,000 Dollars, but has a payoff of 20,000 Dollars with probability 0.2, 10,000 with probability 0.6, and zero otherwise.

(a) Then *5 points*

The expected utility of making the investment is

The expected utility of *not* making the investment is

Therefore the person should (*circle the correct answer*) **make the investment**

not make the investment.

(b) Now suppose that highest payoff is *m* instead of 20,000 Dollars. Determine the value of *m* such that the person is just indifferent between making and not making the investment. *5 points*

***m* =**