Name:

E-mail: *@uiuc.edu*

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 The income offer curve equation is $5x_2/(3x_1) = 2/3$, i.e., $5x_2 = 2x_1$. The budget line equation is $2x_1 + 3x_2 = 64$. Thus,

$$\boldsymbol{x_1 = 20, x_2 = 8}$$

Question 2 The Lagrangean is given by $\mathfrak{L} = \ln(x_1)+\ln(x_2)+\ln(600-L)-\lambda(x_1+4x_2-20L)$.

The first order conditions are $1/x_1 = \lambda$, $1/x_2 = 4\lambda$, $1/(600 - L) = 20\lambda$. Thus, $x_1 = 4x_2 = 12,000-20L$. Inserting this into the constraint yields $24,000-40L-20L = 0$. Thus,

At the optimum $L = 400$

Question 3 A utility function is given by $u(x_1, x_2) = 27x_1^2x_2$. The resulting demand functions are

$$x_1(p_1, p_2, I) = \frac{2I}{3p_1}, \quad , x_2(p_1, p_2, I) = \frac{I}{3p_2}.$$

Then

$$\boldsymbol{v(p_1, p_2, I) = \frac{4I^3}{p_1^2 p_2}}$$

To get the expenditure function, solve $u = \frac{4I^3}{p_1^2 p_2}$ for I. Thus, $I = (1/4)^{1/3} p_1^{2/3} p_2^{1/3}$.

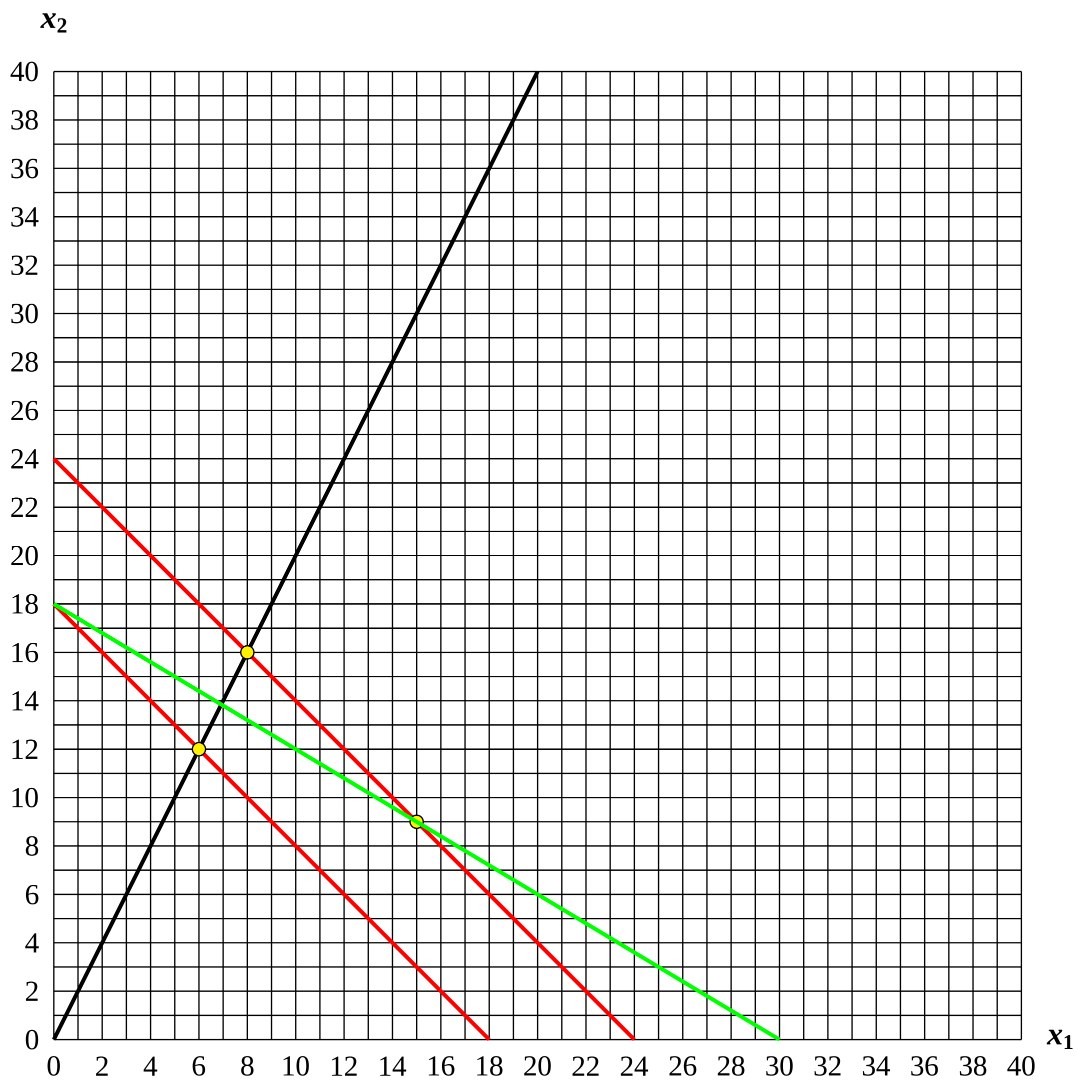
$$\boldsymbol{e(p_1, p_2, u) = (1/4)^{1/3} u^{1/3} p_1^{2/3} p_2^{1/3}}$$

To get Hicksean demand for good 1 we substitute $e(p_1, p_2, u)$ for I in the demand function for good 1, i.e., $h(p_1, p_2, u) = \frac{2e(p_1,p_2,u)}{3p_1} = \frac{2u^{1/3}p_1^{2/3}p_2^{1/3}}{4^{1/3}3p_1}$.

$$\boldsymbol{h_1(p_1, p_2, u) = (2/3)u^{1/3}\left(\frac{p_2}{4p_1}\right)^{1/3}}$$

Question 4 The Slutzky substitution effect for goods 1 and 2 is $\boldsymbol{\Delta^s x_1 = -7, \Delta^s x_2 = 7}$

The Slutzky income effect for goods 1 and 2 is $\boldsymbol{\Delta^I x_1 = -2, \Delta^I x_2 = -4}$



Question 5 Demand for good 1 after the tax is $x_1 = 900/18 = 50$. Thus,

The government's tax revenue is 400.

Utility after the tax is $v(9, 1, 900) = 300$. Thus,

After tax utility is 300

To get the above after tax utility at prices are $p_1 = p_2 = 1$, we need $I' = e(1, 1, 300)$. Thus,

$\boldsymbol{I' = 300}$

The deadweight loss of the tax is therefore −200.

Question 6 The person solves

$$\max_{\alpha} 60\alpha + 44(100 - \alpha) - 0.2\alpha^2.$$

Thus, $60 - 44 - 0.4\alpha = 0$.

The optimal $\alpha = 40$

Question 7 If the person does not start the business, then the payoff is 160,000. If the person starts the business, then the payoff is 360,000 with probability p and $40,000$ with probability $1 - p$.

(a) Suppose the person's Bernoulli utility function is $u(x) = \sqrt{x}$. The expected utility of not starting the business is 400. The expected utility of starting the business is $600p + 100(1 - p)$. The person is indifferent if $400 = 600p + 100(1 - p)$. Thus,

To start the business $p \geq 0.6$

(b) The expected utility of not starting the business is $-1/160,000$. The expected utility of starting the business is $-(1/360,000)p - (1/10,000)(1 - p)$. The person is indifferent if $(1/160,000) = (1/360,000)p + (1/10,000)(1 - p)$. Thus,

To start the business $p \geq 27/28 = 0.964$

(c) Who is more risk averse? (circle the correct answer)

The Person in (b)

The person in (b) needs a higher a higher success probability in order to be willing to start the project.

Question 8 A lottery has the following possible payoffs: With probability 1/10 the payoff is 36 Dollars. With probability 1/5 the payoff is 9 Dollars and with probability 1/2 the payoff is 1 Dollar. Suppose the person's Bernoulli utility is $\sqrt{x}$.

(a) The expected utility of the lottery is $0.1(6) + 0.2(3) + 0.5 = 1.7$.

The certainty equivalent of the lottery is 2.89

(b) Now suppose that the highest payoff is m instead of 25 Dollars. Then the expected utility of the lottery is $0.1\sqrt{m} + 0.2(3) + 0.5 = 3$.

$\boldsymbol{m = 361}$