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.
Scratch paper is attached at the end of the form. You can also use the the back of the form.

Question 1 There are two goods. The Walrasian demand function for good 1 is

$$x_1(p_1, p_2, w) = \frac{p_2^2}{p_1^2}.$$

Then the expenditure function with $e(1, 1, u) = u$ is given by *12 points*

$\boldsymbol{e(p_1, p_2, u) =}$

Question 2 Suppose utility is give by $u(x_1, x_2) = x_1 x_2$ which results in the demand function $x(p, w) = (w/(2p_1), w/(2p_2))$. Currently prices are $p_1 = 1$, $p_2 = 1$ and wealth is $w = 40$.

(a) Suppose that the government introduces a tax of 3 Dollars per unit on good 1, raising the price to $p_1 = 4$ (p_2 and w remain the same). Then *10 points*

The government's tax revenue is

The loss to the consumer using the equivalent variation is

The deadweight loss is	**% of the tax revenue**

(*Note:* Recall that the equivalent variation is concerned about an ex-ante wealth change that is equivalent in the effect to the price change).

(b) Now suppose that a tax of 1 Dollars is introduced on both prices, raising them to $p_1 = p_2 = 2$. Then *6 points*

The government's tax revenue is

The loss to the consumer using the equivalent variation is

The deadweight loss is % of the tax revenue

Question 3 Let Y be a technology with two outputs and K inputs. Input prices are w. Let $F(\cdot)$ be the transformation function, i.e., $Y = \{(-z, q_1, q_2) | F(-z, q_1, q_2) \leq 0\}$, where $z \in \mathbb{R}_+^K$. Suppose we define $C(q_1, q_2; w)$ as the minimum cost of producing q_1 units of output 1 and q_2 units of output 2, given that factor prices are w. Then *10 points*

$$\boxed{\frac{\frac{\partial C(q_1,q_2;w)}{q_1}}{\frac{\partial C(q_1,q_2;w)}{q_2}} = \qquad\qquad\qquad\qquad\qquad\qquad}$$

(*Note:* The right-hand side should be the simplest possible expression you can find, but it should not contain $C(\cdot)$ or its derivatives. The envelope theorem helps.)

Question 4 A technology Y is depicted below. *12 points*

Let $\pi(p_1, p_2)$ be the profit function. Then

$\boldsymbol{\pi(2,1) =}$	$\boldsymbol{\pi(1,1) =}$	$\boldsymbol{\pi(1,2) =}$
$\boldsymbol{\pi(1,3) =}$	$\boldsymbol{\pi(1,4) =}$	$\boldsymbol{\pi(2,5) =}$

Question 5 Suppose that a production function is given by $f(z) = 2z + \sqrt{z}$. Suppose that $w = 4$. Then a solution to the profit maximization problem exists *12 points*

for all $\boldsymbol{p}$ that fulfill

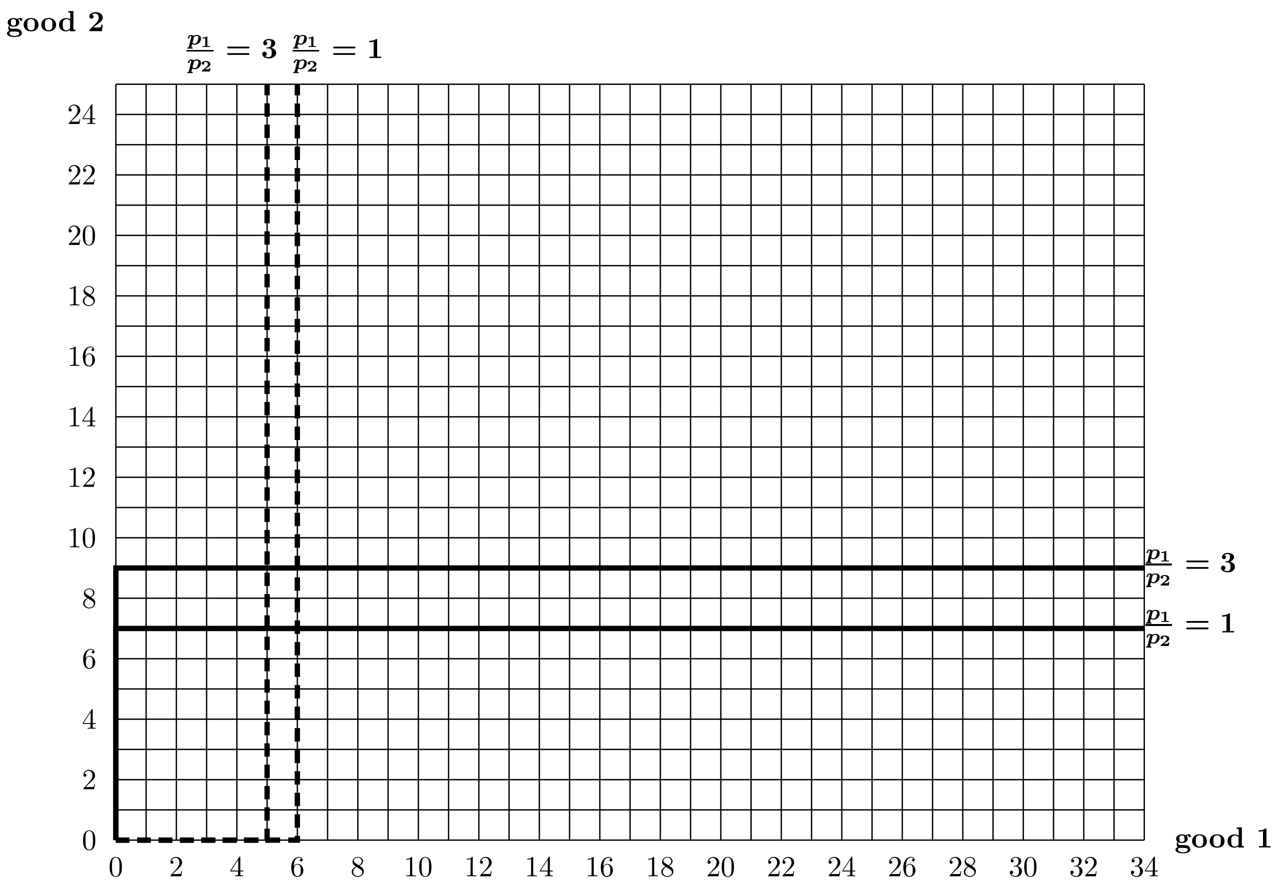
for these $\boldsymbol{p}$, supply is $\boldsymbol{z(p)} =$

Question 6 There are two consumers, A and B. A's wealth offer curves are given by the dashed lines, and B's wealth offer curves by the solid lines below. Wealth offer curves are provided for two different price ratios, as indicated in the graph.

Suppose that A's endowment of the two goods is $e^A = (0, 15)$ and B's endowment is $e^B = (15, 0)$. Thus, agent $i = A, B$'s wealth at prices p is $w^i = p.e^i$.

Prove the following: There do not exist preferences $\succeq$ that generate aggregate consumption, i.e., such that $x^A(p, p.e^A) + x^B(p, p.e^B)$ is the demand of a consumer with preferences $\succeq$ and aggregate endowment $e^A + e^B$.

Note: Part of your proof should be graphical. Provide The remainder of the argument (only a few lines) in the box below. *12 points*



Question 7 Suppose that Bernoulli utility is given by $u(x) = x - \beta x^2$, where $\beta > 0$.

(a) Then *4 points*

absolute risk aversion is	**, which is**

increasing in β	**decreasing in β**	**not monotone**

when $u' \geq 0$ (*mark the correct answer*)

10 points

(b) Suppose that the person has a wealth of w. He must invest α in a risky asset with a return z and β in a riskless asset with a return of 1. Thus, after uncertainty is revealed, the portfolio's value is $\alpha z + \beta$ (clearly, $\alpha + \beta = w$). Suppose that z is uniformly distributed on $[0, 3]$. Determine the optimal choice of α as a function of w and β.

$\boldsymbol{\alpha} =$

Question 8 Suppose there are two individuals, $i = 1, 2$, with the same wealth w, but possibly different utility functions u^1 and u^2. In particular, suppose that person 2 is more risk averse than person 1, i.e., $r_A(x, u_2) \geq r_A(x, u_1)$, where u_i is person i's utility function (assume that $u_i' > 0$ and $u_i'' < 0$). Each of the two individuals has the same probability p of having an accident, resulting in loss of D, reducing wealth from w to $w - D$. With probability $1 - p$ there is no accident, and the person's wealth remains w. Now suppose that the individuals have access to insurance. At a cost of z_N in the no-accident state, the person would receive a payment z_A if an accident occurs. Thus, $z_N \leq 0$, $z_A \geq 0$ and suppose that $qz_A + (1 - q)z_N = 0$, where $q > p$. With insurance, wealth in the accident state is $w - D + z_A$, and wealth in the non-accident state is $w + z_N$.

Let z_A^i, $i = 1, 2$ be individual i's optimal insurance choice. Then *12 points*

$\boldsymbol{z_A^1 \geq z_A^2}$	$\boldsymbol{z_A^2 \geq z_A^1}$	**no comparison can be made in general**

(*mark the correct answer*)

Provide a clear argument in the box below

Scratch Paper: Not graded!!!

Scratch Paper: Not graded!!!

Scratch Paper: Not graded!!!

Scratch Paper: Not graded!!!