

Name:

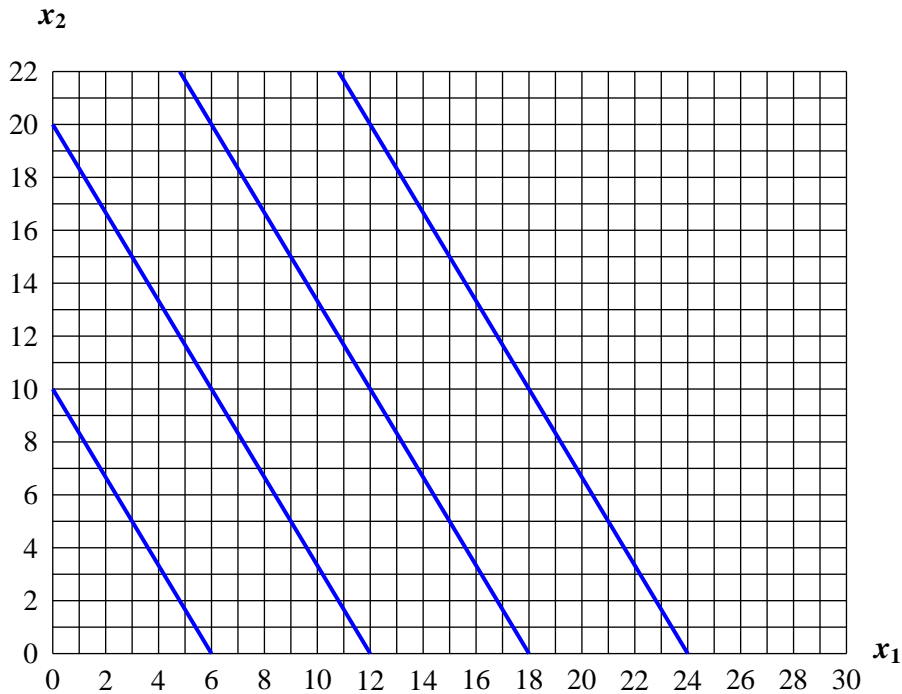
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All questions must be answered on this test form!

For each question you must show your work and (or) provide a clear argument.

All graphs must be accurate to get credit.

Question 1 Consumer preferences are depicted below:



1. Suppose that (6, 10) is the optimal consumption and that $p_1 = 30$.

Then $p_2 =$, $I =$.

5 points

2. Suppose prices are $p_1 = 1$, $p_2 = 3$. Then the minimum amount of income the person needs to get the same utility as (3, 5) is given by $I =$.

5 points

3. Suppose that $I = 15$, $p_1 = 3$ and $p_2 = 1$. Then the optimal consumption is

$x_1 =$, $x_2 =$.

5 points

Question 2 Demand is given by $Q_D(P) = 100 - P$, and supply is $Q_S(P) = 20 + 3P$.

(a) The equilibrium price and quantity are

$P =$	$, Q =$
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5 points

(b) Now suppose that because of a price control $P = 14$. That is, producers can only sell their product at a price of 14 Dollars. However, suppose that those who are lucky enough to get the product at $P = 14$ can choose to resell it. The equilibrium price in the secondary market, and the quantity produced are given by

$P =$	$, Q =$
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5 points

(c) Now suppose that the government wants to provide a subsidy s to buyers, i.e., if the equilibrium price is P then consumers pay $P - s$, while the producers get P per unit. Determine the size of the subsidy such that the consumers pay 14 Dollars including the subsidy, i.e., such that $P - s = 14$ (Note that if s is changed, the equilibrium value of P changes).

The subsidy is $s =$

5 points

Question 3

- (a) Suppose demand is linear. At a price of $P = 5$ demand is 40 units. The price elasticity of demand at $P = 5$ is $\epsilon_D = -2$. Then the demand function is given by

$Q_D(P) =$

5 points

- (b) Suppose the demand function is given by $Q_D(P) = 30 - 5P$. Determine the price P at which the price elasticity of demand is -1 .

$P =$

5 points

- (c) Suppose that the demand function is linear. At $P = 8$ demand is $Q = 20$, and at $P = 12$ demand is $Q = 14$. Determine the price P at which the price elasticity of demand is -3 .

$P =$

5 points

Question 4 Suppose preferences are given by $u(x_1, x_2) = \min\{3x_1, x_2\}$. Prices are given by $p_1 = 2, p_2 = 1$. Income is $I = 30$. In both cases below you must draw the budget line (iso cost curve) and the indifference curve through the solution.

(a) Determine the optimal consumption graphically.

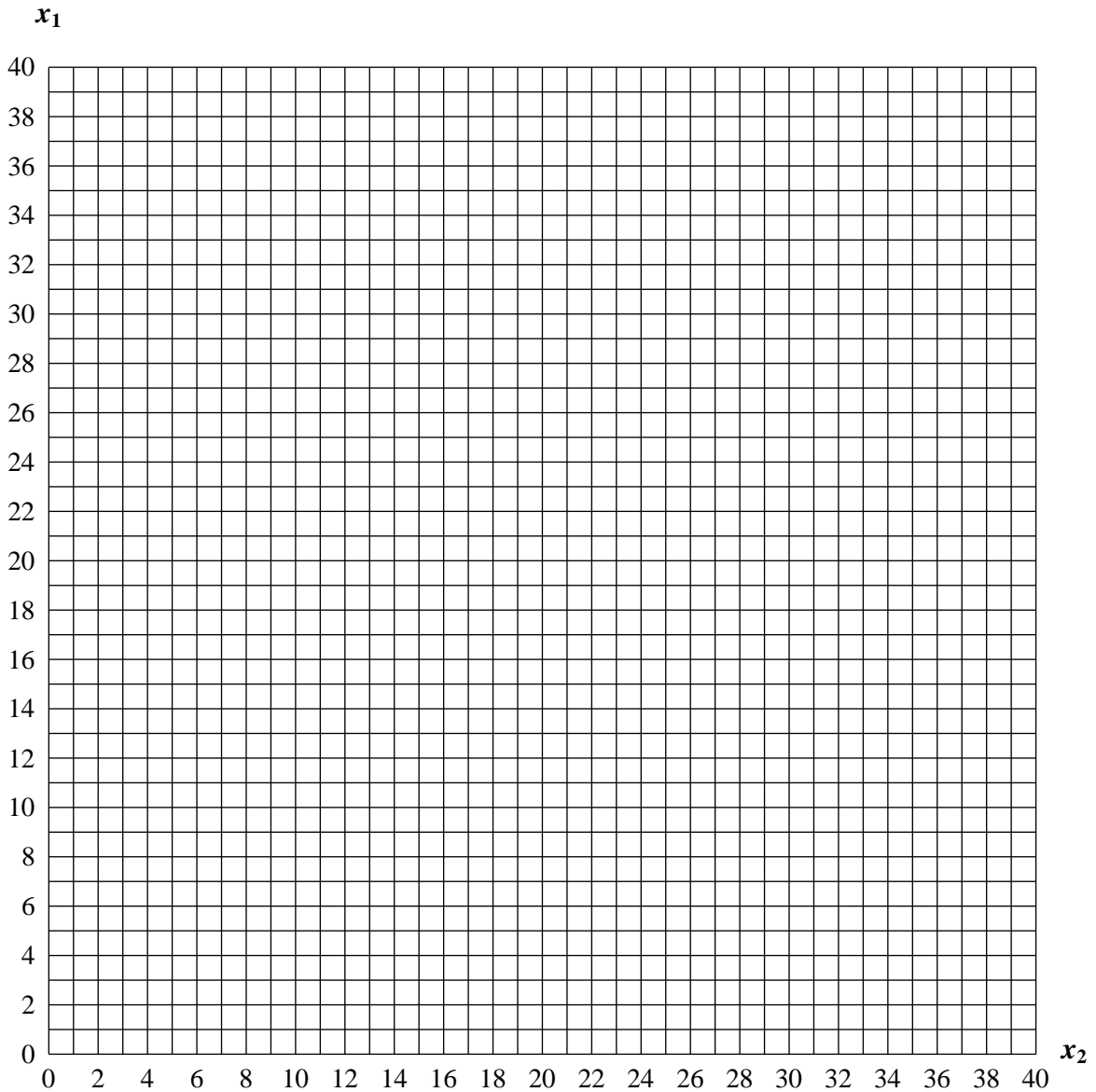
5 points

The optimum is $x_1 =$, $x_2 =$.

(b) Determine graphically the least costly consumption choice that gives the same utility as (9, 9) at prices $p_1 = 5, p_2 = 2$.

5 points

$x_1 =$, $x_2 =$.



Question 5 Solve the following optimization problem

$$\max_{x_1, x_2} 2x_1 + x_2 \text{ subject to}$$

(i) $x_1 + x_2 \leq 26$

(ii) $2x_2 - x_1 \geq 10$

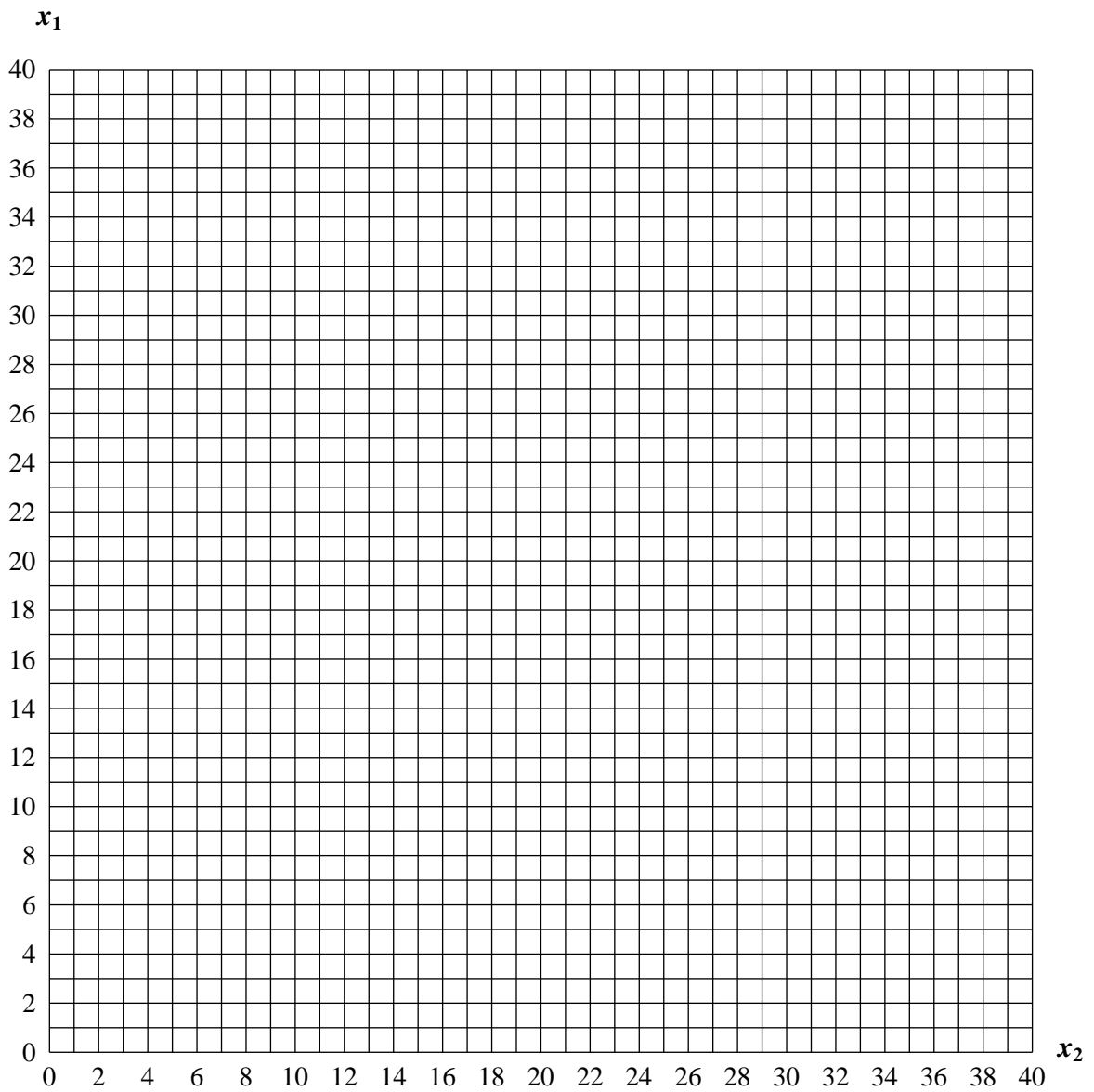
(iii) $4x_1 + x_2 \leq 80$

(iv) $x_1 + 3x_2 \leq 66$

Determine the optimum graphically. *Indicate the feasible set by shading it!*

15 points

At an optimum $x_1 =$	$x_2 =$
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Question 6 A utility function is given by $u(x_1, x_2) = \min\{x_1 + 3x_2, 3x_1 + x_2\}$. Suppose prices are $p_1 = 10$ and $p_2 = 2$. The person's income is $I = 100$. The government introduces a tax of 8 Dollars on each unit of good 2, which raises the price of good 2 to $p_2 = 10$.

Use the grid on the next page to answer the following questions. In all cases below you must graph the indifference curve and the budget line through the solution point.

Then:

15 points

The after-tax demand is $x_1 =$ $x_2 =$

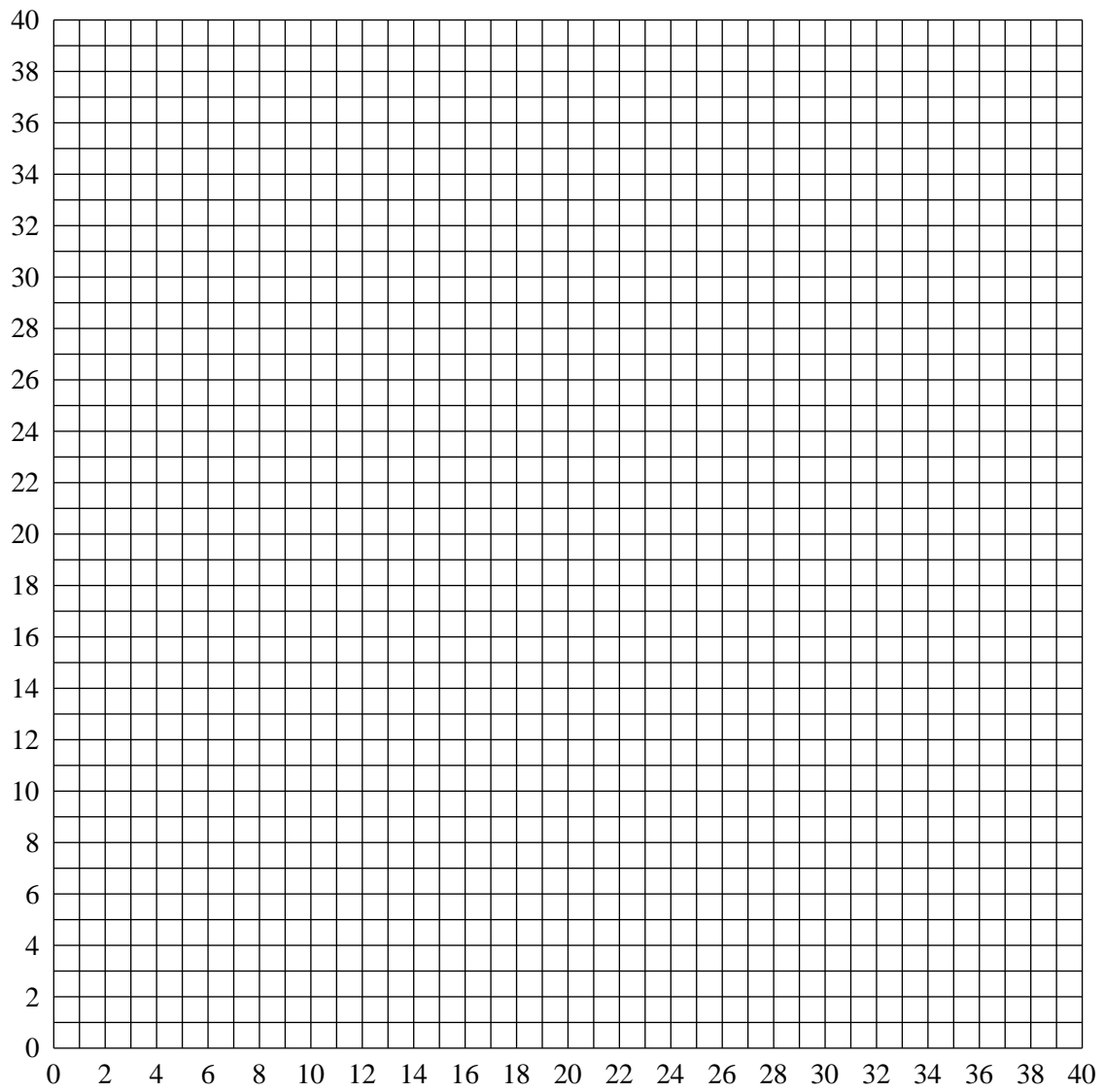
The government's tax revenue is

We now want to determine the loss of the consumer due to the tax. In particular, consider the pre tax-prices of $p_1 = 10$, and $p_2 = 2$. The least costly consumption bundle that gives the consumer the after tax utility at the pre-tax prices is

$x_1 =$ $x_2 =$

and the cost of this consumption bundle (at pre-tax prices) is $I =$

The deadweight loss of the tax is therefore



Question 7 Suppose there are two goods, with prices $p_1 = 1$ and $p_2 = 2$. The person's income is $I = 30$. However, good 1 is rationed, i.e., at the price of $p_1 = 1$ the person can only purchase 10 units of good 1. The person's preferences are given by $u(x_1, x_2) = 5x_1 + x_2$.

Use the grid on the next page to answer the following questions. You must clearly indicate the budget set by shading it and graph the indifference curve through the solution.

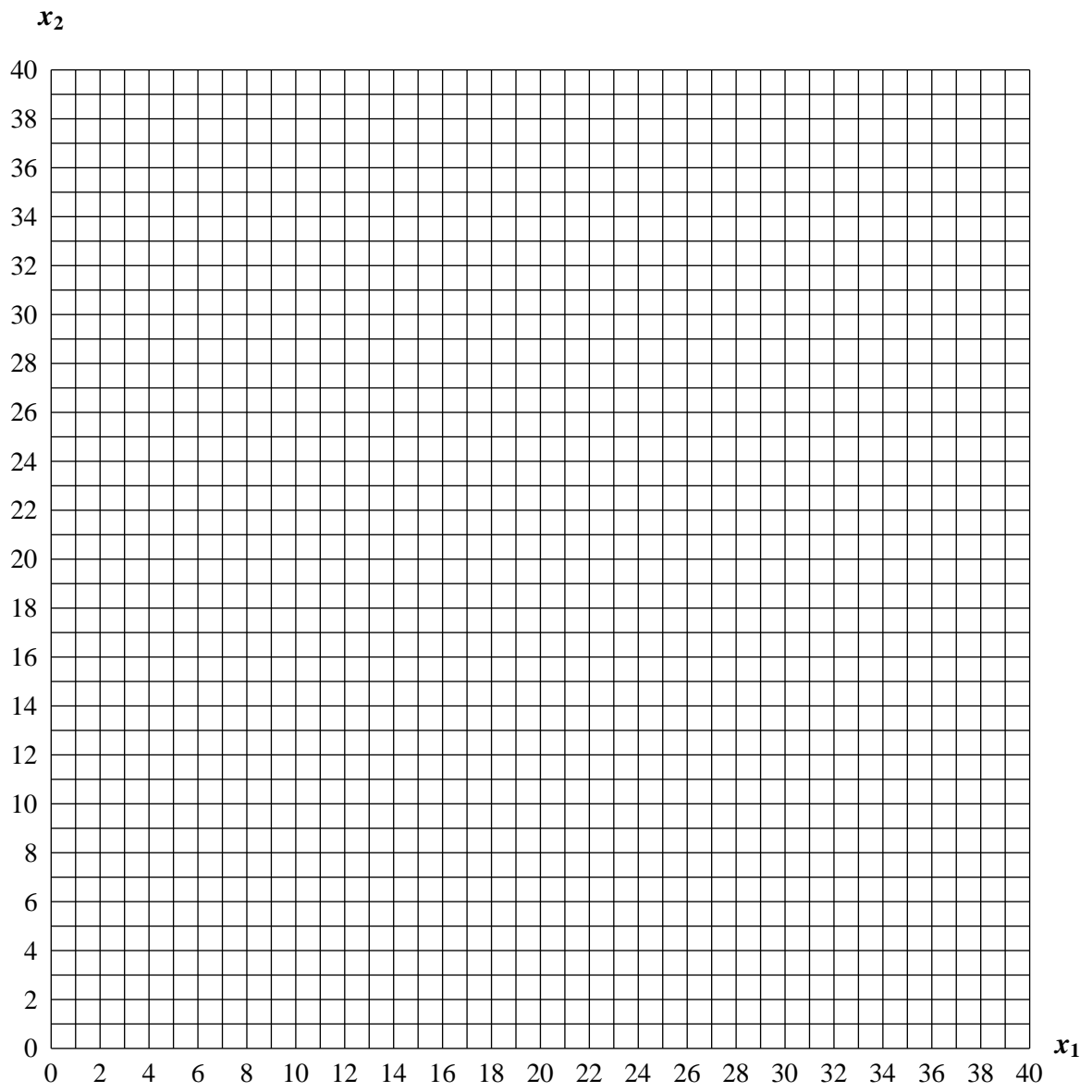
The optimal consumption is $x_1 =$ $x_2 =$

5 points

Determine the price of good 1, p'_1 , at which the consumer would be indifferent between rationing at 10 units at the price $p_1 = 1$ and no rationing but the higher price p'_1 .

$p'_1 =$

5 points



Question 8 Preferences are depicted below.

Suppose that prices are $p_1 = 1$, $p_2 = 2$ and income is $I = 30$. Then

optimal consumption is $x_1 =$ _____ , $x_2 =$ _____

Suppose that prices are $p_1 = 4$, $p_2 = 3$, and the person wants to obtain the same utility as (18, 18). The the person needs and income of at least **$I =$ _____**. *10 points*

