

Name:

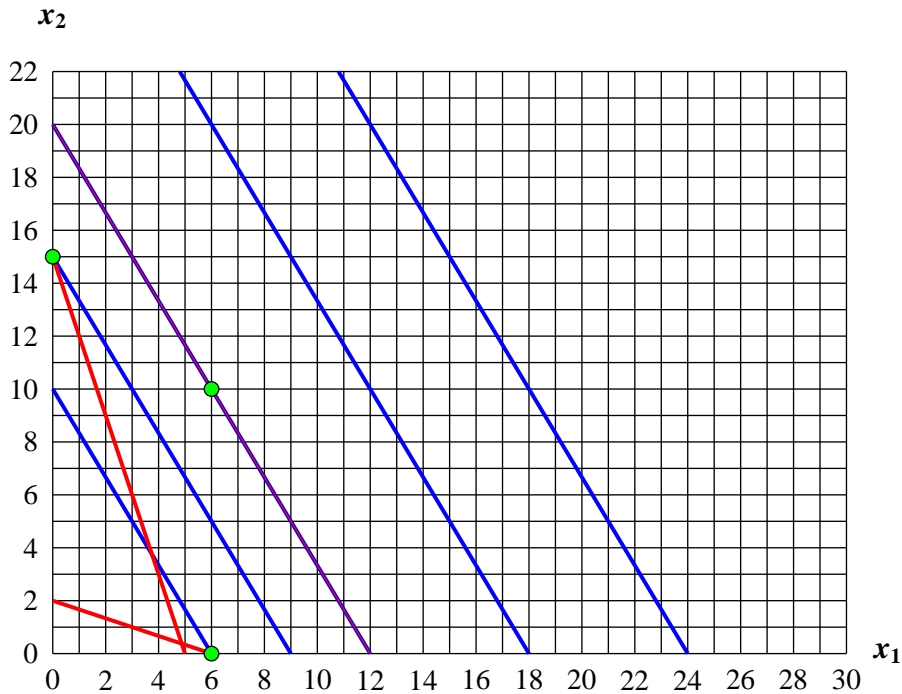
E-mail: @uiuc.edu

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 Consumer preferences are depicted below:



1. Since (6, 10) is the optimal consumption, we must have $MRS = p_1/p_2$. Thus, $5/3 = 30/p_2$, i.e., $p_2 = 18$.

Then $p_2 = 18, I = 360$.

2. If prices are $p_1 = 1, p_2 = 3$, then it is optimal only to consume good 1. Then the minimum amount of income the person needs to get the same utility as (3, 5) is given by $I = 6$.

3. If $p_1 = 3$ and $p_2 = 1$, then it is only optimal to consume good 2. Thus, the optimal consumption is $x_1 = 0, x_2 = 15$.

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

$$P = 20, Q = 80$$

(b) Supply is $Q_S(14) = 62$. Thus, $Q_D(P) = 62$ implies $P = 38$.

$$P = 38, Q = 62$$

(c) Demand is $Q_D(P - s) = Q_D(14) = 86$. Therefore $Q_S(P) = 86$. Hence, $P = 22$.
Therefore $22 - s = 14$ implies $s = 8$

$$\text{The subsidy is } s = 8$$

Question 3

(a) Let $Q_D(P) = a - bP$. Then $\epsilon_D = -bP/Q$. Thus, $-2 = -5b/40$. Hence, $b = 16$.
Thus, $40 = Q_D(5) = a - 80$. Hence, $a = 120$.

$$Q_D(P) = 120 - 16P$$

(b) Suppose the demand function is given by $Q_D(P) = 30 - 5P$. Thus, $-1 = -5P/(30 - 5P)$, which implies $P = 3$

$$P = 3$$

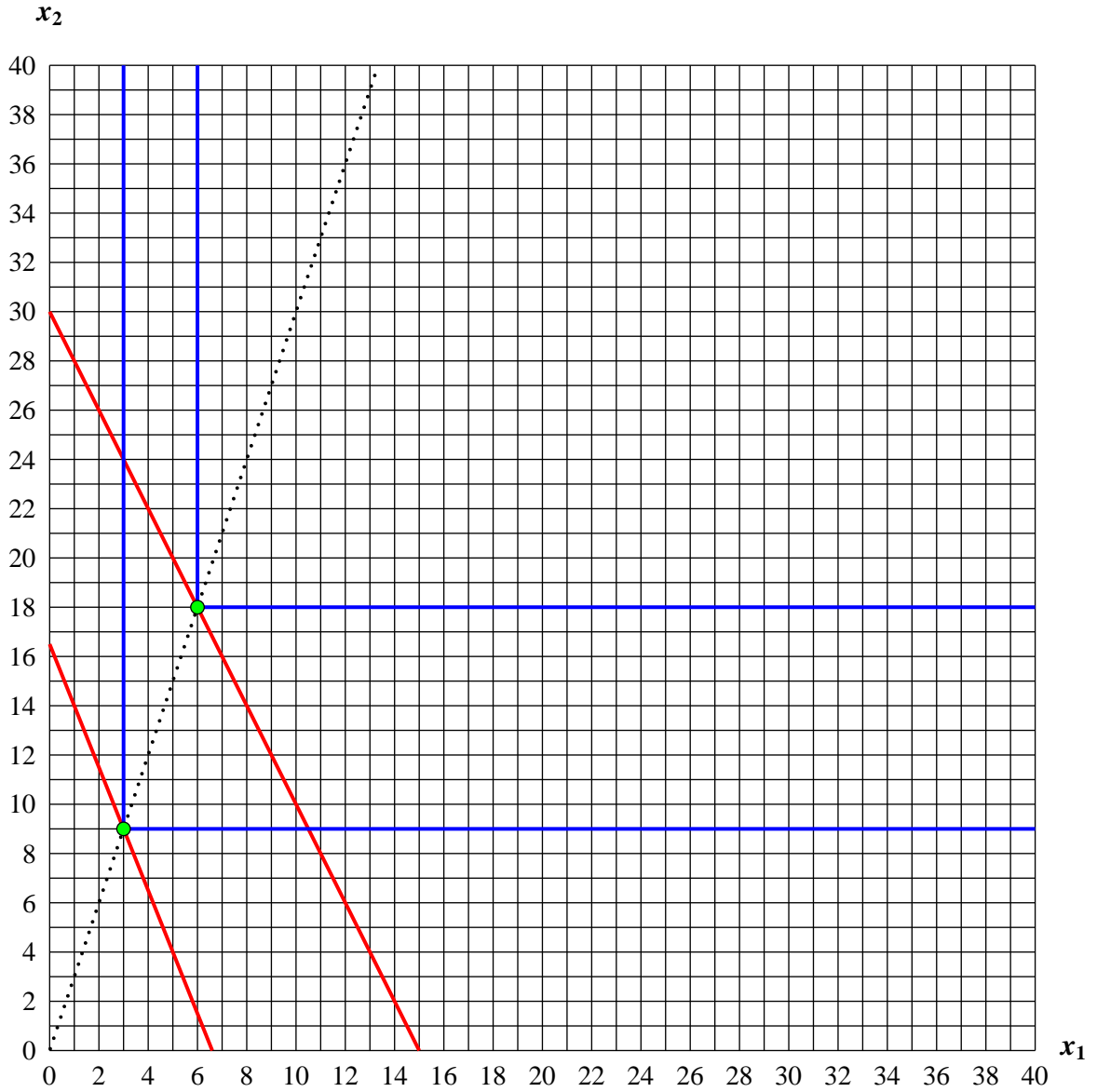
(c) Let $Q_D(P) = a - bP$, then $20 = a - 8b$ and $14 = a - 12b$. Thus, $a = 32$ and $b = 1.5$. Hence the demand function is $Q(P) = 32 - 1.5P$. The price elasticity of demand is therefore $\epsilon_D = -1.5P/(32 - 1.5P) = -3$. Thus,

$$P = 16$$

Question 4

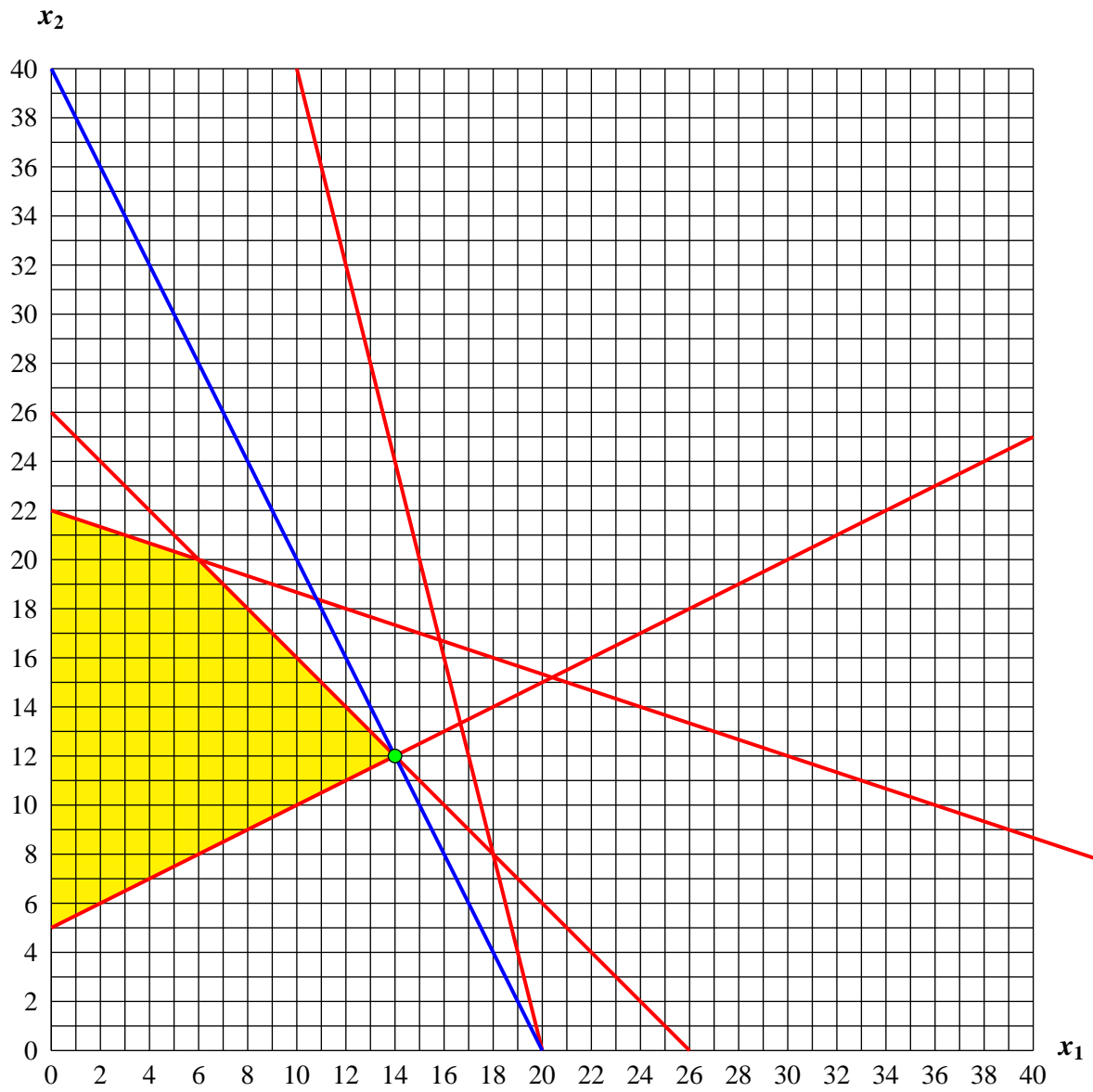
(a) The optimum is $x_1 = 6, x_2 = 18$.

(b) $x_1 = 3, x_2 = 9$.



Question 5 Determine the optimum graphically. *Indicate the feasible set by shading it!*

At an optimum $x_1 = 14, x_2 = 12$



Question 6 **The after-tax demand is $x_1 = 5, x_2 = 5$**

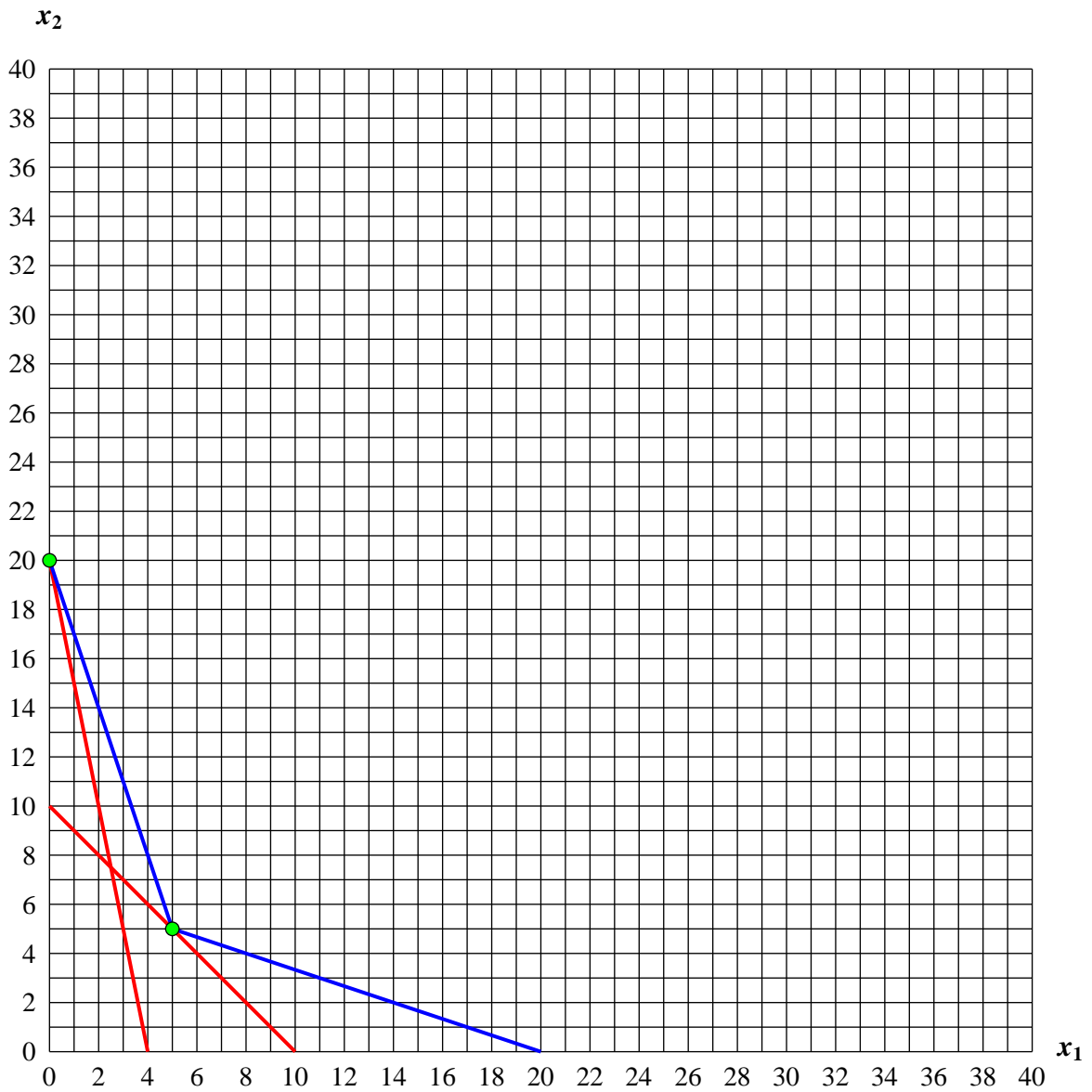
The government's tax revenue is 40

The least costly consumption bundle that gives the consumer the after tax utility at the pre-tax prices is

$x_1 = 0, x_2 = 20$

and the cost of this consumption bundle (at pre-tax prices) is $I = 40$

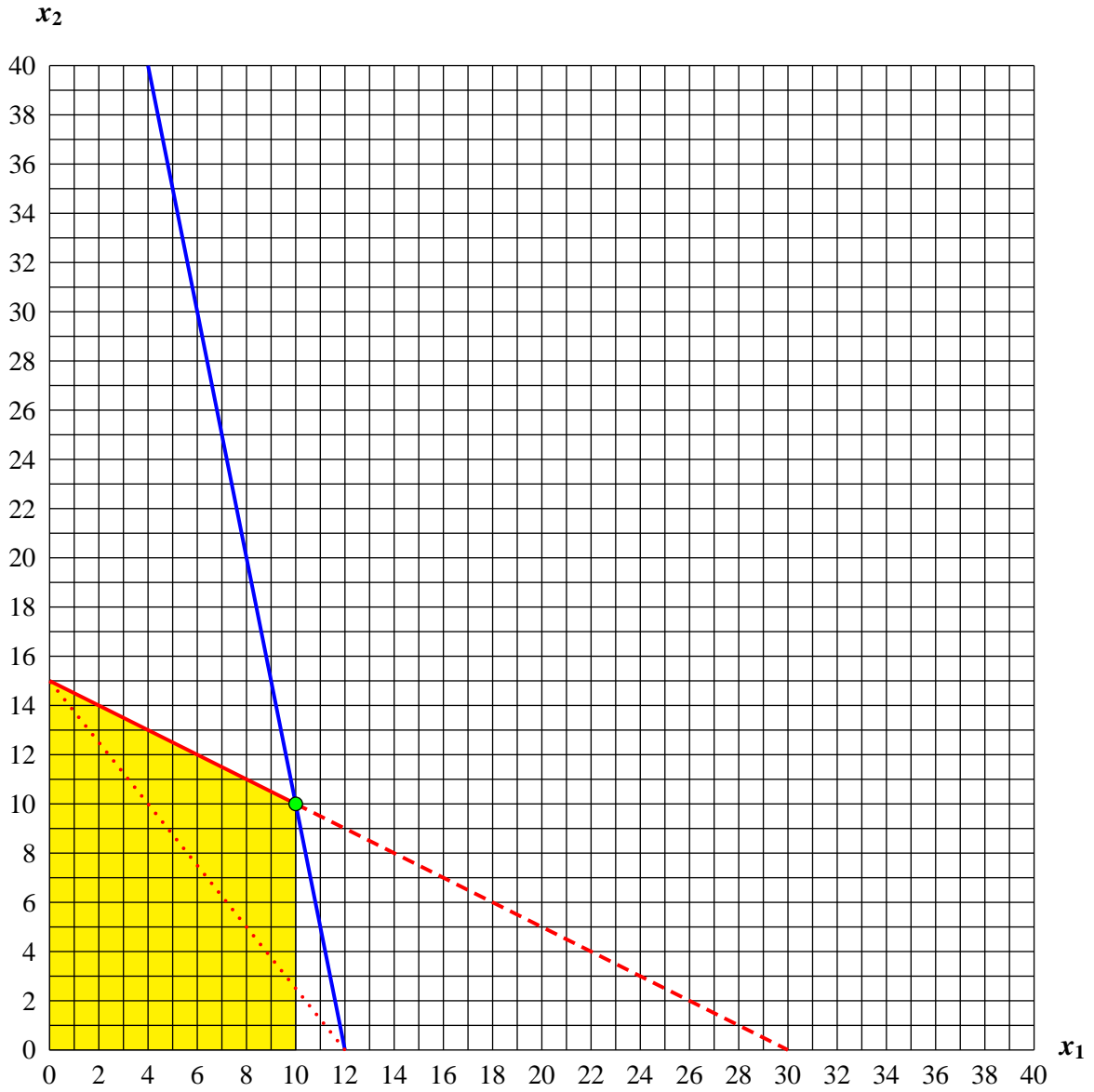
The deadweight loss of the tax is therefore 20



Question 7 **The optimal consumption is $x_1 = 10$ $x_2 = 10$**

At a price of $p'_1 = 2.5$, the person would be able to afford $(12, 0)$ which would be the optimal consumption choice.

$p'_1 = 2.5$



Question 8 Preferences are depicted below.

optimal consumption is $x_1 = 30, x_2 = 0$

The the person needs and income of at least **$I = 81$** .

