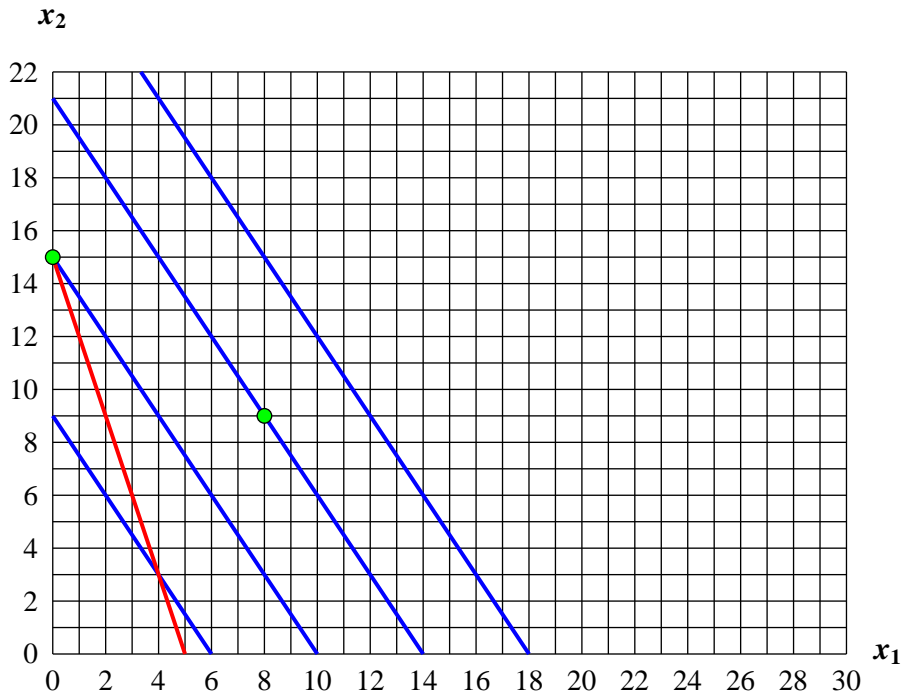


**Question 1**



1. Suppose prices are  $p_1 = 3$ ,  $p_2 = 1$  and that income is  $I = 15$ . Then the optimal consumption is  $x_1 = 0, x_2 = 15$ . 5 points
2. Suppose that (8, 9) is the optimal consumption. Then the budget line must have the same slope as the indifference curve, i.e.,  $p_1/p_2 = 3/2$ . Since  $p_1 = 6$ ,  $p_2 = 4$ .  $p_2 = 4, I = 84$ . 5 points
3. Suppose that (10, 0) is the optimal consumption and that  $p_1 = 60$ . Then  $p_1/p_2 \leq 3/2$ . Thus,  $p_2 \leq 40$ . 5 points

**Question 2** A demand function is given by  $Q_D(P) = 300 - 3P$ . Then the price elasticity of demand is given by

$$\epsilon_D^P = \frac{-3P}{300-3P} . \quad \text{5 points}$$

$\frac{-3P}{300-3P} = -1$  implies  $3P = 300-3P$ , i.e.,  $P = 50$ . **Revenue is maximized at price  $P = 50$** .

At this price, demand is  **$Q = 150$**  and **revenue is 7,500**. 5 points

**Question 3** At equilibrium  $200 - 0.1P = 50 + 0.05P$ . Thus, the equilibrium wage is given

by  **$P = 1,000$** .

4 points

Now,  $200 - 0.1P = 150 + 0.15P$ . Thus, the new equilibrium wage is  **$P = 200$** .

4 points

Restriction on immigration will result in a higher wage for unskilled workers. Thus, unions representing such workers may favor such restrictions.

At  $P = 500$ , demand is 150. Supply is 75. Thus, the excess demand for labor is

**50 %** of the demand for labor.

4 points

**Question 4** Suppose that demand is linear. At a price of  $P = 20$  demand is  $Q = 30$  and the demand elasticity at  $-0.5$ . Thus,  $-0.5 = \frac{-bP}{Q} = \frac{-20b}{30}$ . Thus,  $b = 0.75$ . Therefore, demand is  $Q = a - 0.75P$ . Thus,  $30 = a - 15$ , i.e.,  $a = 45$ .

Then demand is given by

**$Q_D(P) = 45 - 0.75P$** .

6 points

Thus,  $\epsilon = \frac{-0.75P}{45 - 0.75P}$ . Therefore

**if the price is  $P = 10$  the demand elasticity is  $-0.2$** .

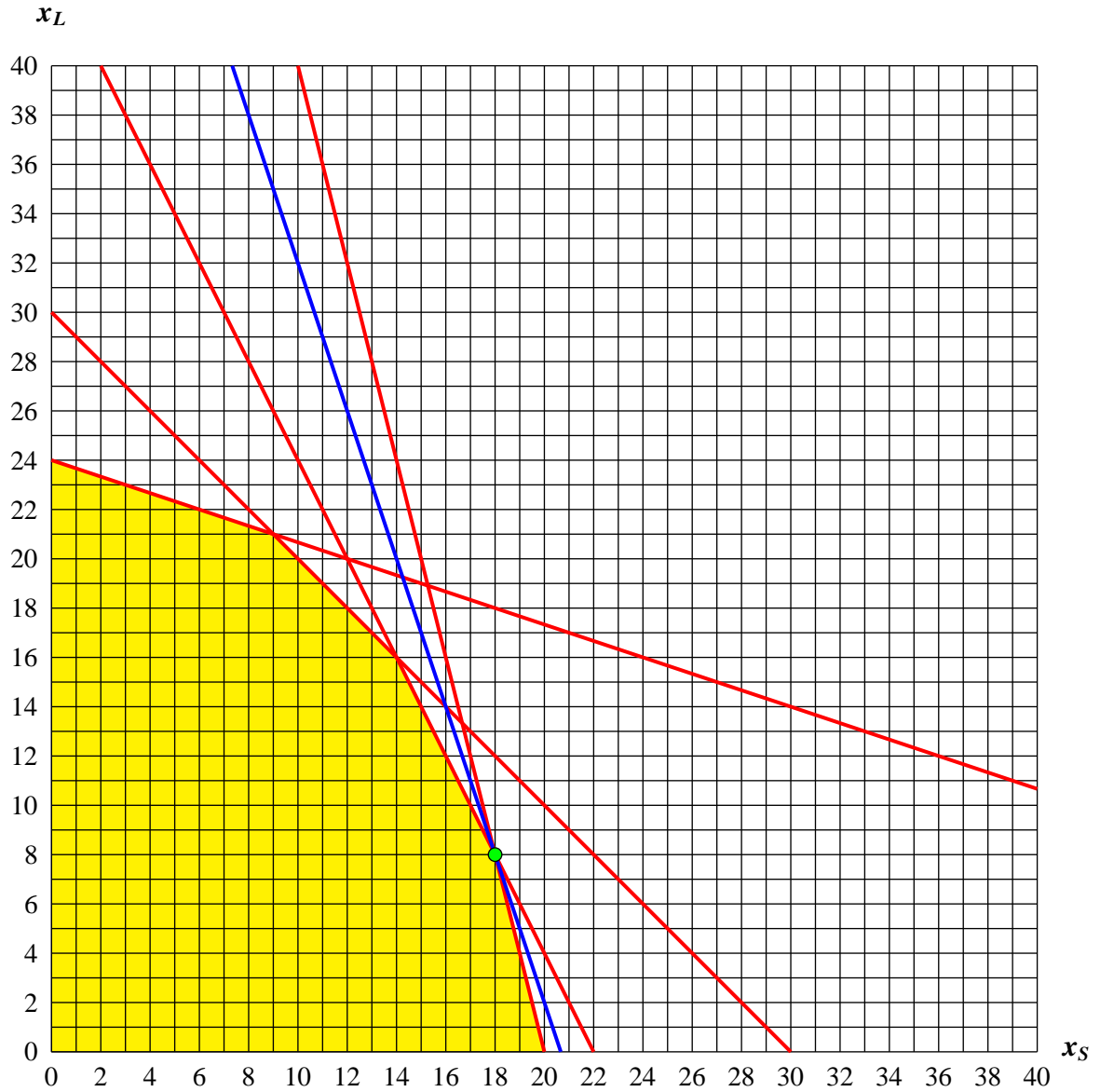
4 points

**Question 5**

15 points

**At an optimum  $x_1 = 18, x_2 = 8$**

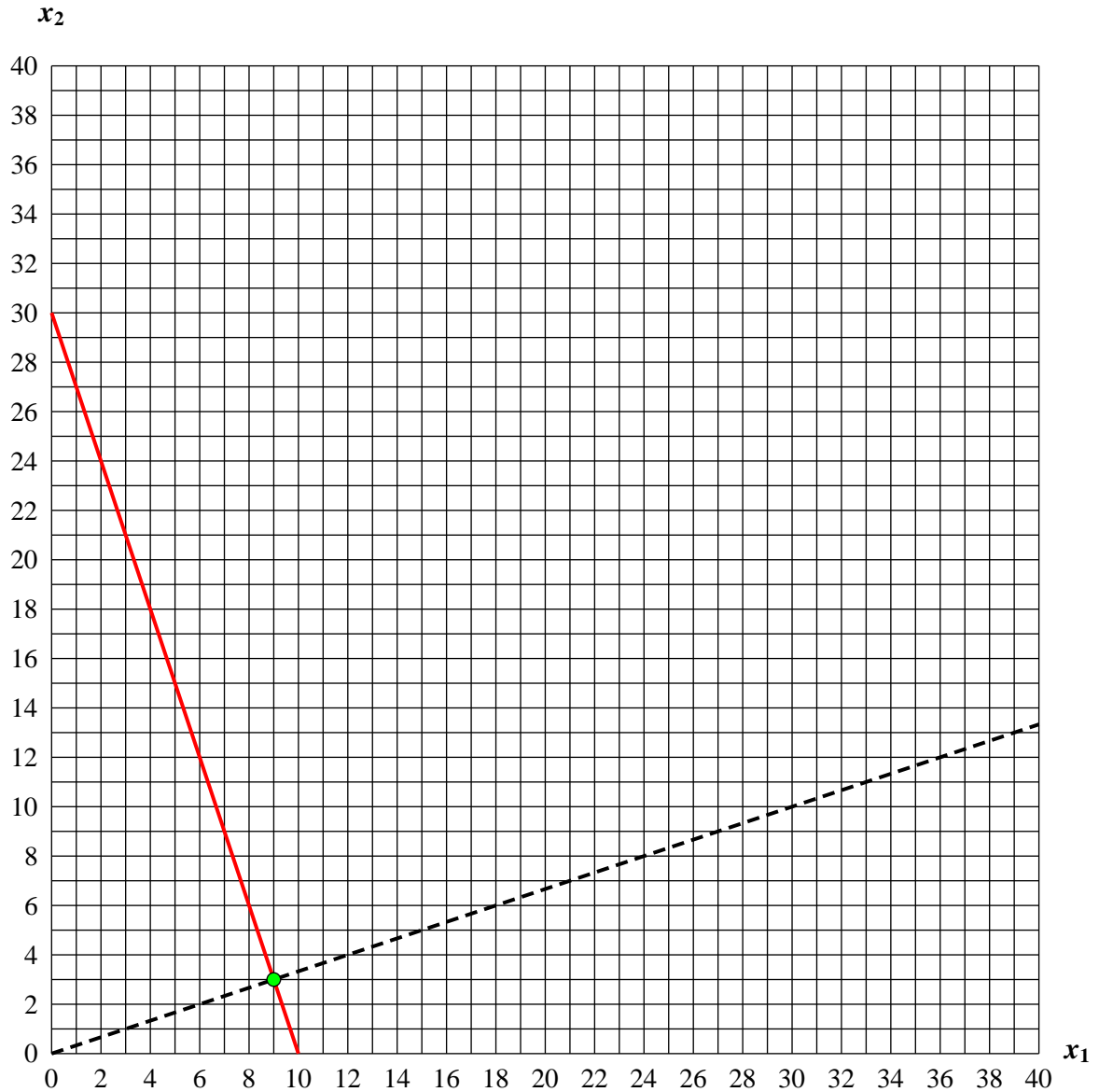
**The maximum revenue is 62**



Question 6

**At the optimal choice,  $x_1 = 9, x_2 = 3$**

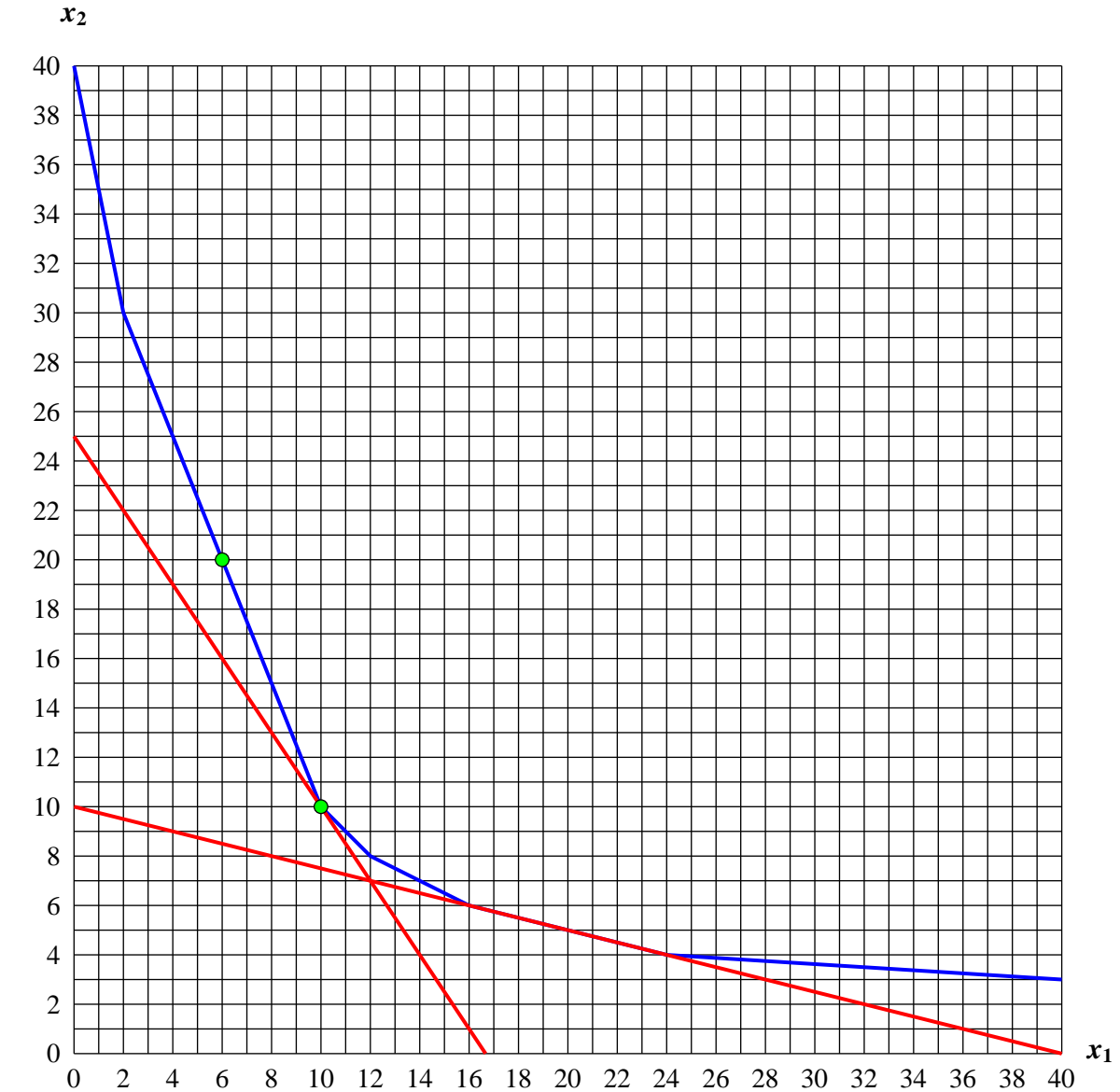
15 points



**Question 7**

(a) The least costly consumption bundle that gives the same utility as  $(6, 20)$  at price  $p_1 = 3, p_2 = 2$  is  $x_1 = 10, x_2 = 10$  5 points

(b) At prices  $p_1 = 2, p_2 = 8$  how much money does the person need to get the same utility as  $(6, 20)$   $I = 80$  5 points



**Question 8** In equilibrium  $200 - 4P = 10 + P$ , i.e.,  $P = 38$ .

If the government pays a subsidy of 10 Dollars per unit produced to suppliers, then supply is  $Q_S(P + 10) = 10 + (P + 10) = 20 + P$ . Thus,  $20 + P = 200 - 4P$ , i.e.,  $P = 36$

**The equilibrium price before the subsidy is  $P = 38$**

**The equilibrium price after the subsidy is  $P = 36$**

Firms supply  $20 + 36 = 56$  units. Thus,

**The government's total subsidy payment is 560**

*10 points*