Micro 2 -Problem Set 4

Question 1:

Consider a market with two products X and Y, where Y represents money. The demand is set according to the preferences of a representative consumer whose utility function is

$$100x - \frac{x^2}{2} + y$$

(assume that the consumer income is high enough so there is no corner solutions). The supply in the market is set by a representative firm whose production function is

$$f(k,l) = l^{\frac{1}{4}} \cdot k^{\frac{1}{4}}$$

and where $p_k = \frac{1}{4}$ and $p_l = \frac{1}{4}$.

1. Find the equilibrium price and the equilibrium quantity in the market.

2. Calculate the overall welfare in equilibrium, the consumer surplus, and the firm surplus.

Assume now that the government intervenes in the market and set a maximal price for the good x denoted by $\bar{p}$.

3. Describe how the social welfare changes as $\bar{p}$ changes. What happens to it with respect to its level under the competitive equilibrium?

4. Describe how the firm surplus changes as $\bar{p}$ changes. What happens to it with respect to its level under the competitive equilibrium?

5. Describe how the consumer surplus changes as $\bar{p}$ changes. What happens to it with respect to its level under the competitive equilibrium?

6. Does setting a maximal price necessarily benefits the consumer? what is the level of $\bar{p}$ which maximizes the consumer surplus.

Question 2:

Consider the representative consumer and producer model introduced in class (in the section on partial equilibrium). Assume that $v(x)$ is a concave function and that $C(x)$ is a convex function. Denote by x^* the equilibrium quantity.
Show that the social welfare is is increasing in quantity as long as the quantity is below x^*, and that it is decreasing as long as the quantity is above x^*.

Question 3:

Consider the representative consumer and producer model introduced in class (in the section on partial equilibrium). Answer whether the following claims are true or false. If a claim is true, provide a logical argument that proves it. If it is not true, find an example that shows the opposite:

1. Government intervention is always bad for the overall social welfare.
2. Government intervention is always bad for the firm surplus.
3. Government intervention is always bad for the consumer surplus.

Question 4:

Consider the representative consumer and producer model introduced in class (in the section on partial equilibrium). Assume the following change occurs in the market:

The firm's technology changes such that its marginal cost is lower than its marginal cost for every quantity x. Answer whether the following claims are true or false. If a claim is true, provide a logical argument that proves it. If it is not true, find an example that shows the opposite:

1. the equilibrium price decreases and the equilibrium quantity increases the change with respect to the equilibrium price and quantity before the change.
2. the overall social welfare after the change increases with respect to the overall social welfare before the change.
3. the consumer surplus increases after the change with respect to the equilibrium price and quantity before the change.
4. the firm surplus increases after the change with respect to the equilibrium price and quantity before the change.