1. A monopolist has a constant marginal cost, and it is facing a linear demand curve. If the government imposes a quantity tax of $\$4$ per unit of output, how much does the price rise?

2. The village of Péteri, located just west of the town of Monor, has a population of $2\ 000$ people. Péteri, very much like Monor, has a single public good, the *village park* and a single private good, *sör*. In Péteri, everyone's utility function is $U_i(X_i, Y) = X_i - 3\ 000/Y$, where X_i is the number of bottles of *sör* consumed by i and Y is the size of the *village park* measured in square meters. The price of *sör* is $\$2$ per bottle. The cost of the *village park* to the village is $\$0.10$ per square meter. Everyone has an income of at least $\$1\ 000$.

   What is the Pareto efficient size for the *village park*?

3. Consider a pure exchange economy with two consumers (let's say, *Attila* and *Balázs*) and two goods (let's say, *exes* and *whys*):

- $u_A(x_A, y_A) = x_A^{\frac{1}{2}} y_A^{\frac{1}{2}}$,
- $u_B(x_B, y_B) = x_B + 4y_B$,
- Agent A initially owns 10 units of *exes* and 1 unit of *whys*: $\omega_A^x = 10$, $\omega_A^y = 1$.
- Agent B initially owns 10 units of *exes* and 4 units of *whys*: $\omega_B^x = 10$, $\omega_B^y = 4$.

(a) Represent this pure exchange economy with the help of an Edgeworth box (a sketch will suffice!), and find (mathematically) the contract curve.

(b) Find (mathematically) and represent graphically the utility possibilities set for this pure exchange economy.

(c) Assume that the two consumers are allowed and able to trade with each other, and that *exes* are the numeraire. Also assume that both consumers act as price-takers.

i. Find the competitive equilibrium of this pure exchange economy. In other words, find the equilibrium price of *whys*.

ii. Find the allocation of *exes* and *whys* in the competitive equilibrium.

iii. Is the allocation of *exes* and *whys* in the competitive equilibrium Pareto efficient? (Hint: Check whether it is located on the contract curve or not.)

iv. Represent the competitive equilibrium in an Edgeworth box. A sketch will suffice as long as it shows the initial endowment, the consumers' budget constraint, the equilibrium allocation, and the indifference curves going through the equilibrium allocation.

(d) The social planner looking over this pure exchange economy would like to maximize the following social welfare function: $SWF(u_A, u_B) = \min\{4u_A, u_B\}$.

i. Find the allocation in the utility possibilities set for this pure exchange economy that maximizes the social welfare function.

ii. How should the social planner rearrange the initial endowment of *exes* (*exes* only!) so that this pure exchange economy reaches the allocation that maximizes the social welfare function through the two consumers trading with each other?

iii. Represent the new competitive equilibrium (after the social planner has rearranged the initial allocation) in an Edgeworth box. A sketch will suffice as long as it shows the original and the rearranged initial endowments, the consumers' budget constraint, the equilibrium allocation, and the indifference curves going through the equilibrium allocation.

(e) Assume that the two consumers are allowed and able to trade with each other, and that *exes* is the numeraire. Also assume that Balázs has market power and acts as price-maker, while Attila acts as price-taker. Use the *original* initial endowment when answering this question.

i. Find the equilibrium of this pure exchange economy. In other words, find the price that Balázs would set for *whys*.

ii. Find the allocation of *exes* and *whys* in this equilibrium.

iii. Is the allocation of *exes* and *whys* in this equilibrium Pareto efficient? (Hint: Check whether it is located on the contract curve or not.)