

IKT3620: Introduction to Environmental Economics
Study Questions
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1. Why isn't zero pollution the best solution for society? Can society have too little pollution? Why or why not?
2. Suppose that the inverse market demand curve for a good is $P = 350 - 2Q$. Let the private marginal cost (unregulated competitive market supply) be $MC_p = 50 + Q$. Producing the good causes pollution. The private marginal damage from pollution is $MC_d = Q$.
 - a- What is the unregulated competitive equilibrium quantity and price?
 - b- What is the social marginal cost of production and social equilibrium quantity and price?
 - c- Use a figure to show the results.
 - d- By putting labels to the the areas in the figure, show the consumer surplus, producer surplus, cost of externality, total welfare for both the social optimum and the unregulated case. Indicate also the change in welfare.
3. Let $x = \bar{P} - P$ where x is abatement and P and \bar{P} are pollution and competitive level of pollution, respectively. The benefit of reducing pollution is $B(x) = A \log(x)$ where A is a positive constant/parameter. The cost of abatement is $C(x) = x^2$.
 - a- Use calculus to determine the optimal level of x . Call this x^* .
 - b- Show the effect of an increase in A on x^* . Interpret your result.
 - c- For $A=8$, solve for questions 3a and 3b.
4. Consider the market for gasoline. Due to the use of gasoline, and therefore, the pollution this causes, there are marginal external costs to health and environment in addition to the private marginal costs of producing and consuming it. For simplicity suppose that the marginal external cost is constant at 1TL per liter of gasoline: $MC_d = 1\text{TL}$. Let the private marginal cost be $MC_p = \frac{1.25}{3} + \frac{1}{300}Q$.
 - a- Calculate the equilibrium price and level of gasoline in the absence of government intervention.
 - b- Calculate the price and level of gasoline in the presence of government intervention (Hint: start by calculating the social marginal cost of producing gasoline).
 - c- The government can remedy the situation by setting an excise tax (in TL/liter) on the gasoline sellers. What would be this level of tax such that the new equilibrium would be the same as in the previous equilibrium.