This homework will help you understand welfare analysis, externalities, and monopoly/monopsony.

1) Let the market for SUVs be characterized by a Societal Utility Function equal to 
   \[ U(S) = 100S - \frac{S^2}{2} \], and a Cost of Production function equal to 
   \[ C(S) = \frac{S^2}{4} \] (where both \( U \) and \( C \) are in $).

   a) Imagine that you are in charge of this economy, how many SUVs should be produced and consumed? What is the net utility to society from this allocation?

   Now imagine that the market for SUVs is competitive.

   b) Derive the Demand Curve for SUVs.

   c) Derive the Supply Curve for SUVs.

   d) What is the Competitive Equilibrium price and quantity sold?

   e) Calculate the Consumer Surplus, and Producer Surplus (also show them graphically). How does the sum of CS and PS relate to your answer to part a)? Explain.

2) Environmentalists claim that SUVs create costs to society that are not taken into consideration in a competitive market. They state that each SUV creates $10 of additional costs to society. (Continue to use the utility and cost functions from above)

   a) What is the Social Dead Weight Loss created by a competitive market for SUVs?

   b) To correct this “market failure,” an environmental group proposes banning all SUVs. What is the SDWL created by this policy?

   c) A business proposes granting a monopoly to one SUV producer. What is the resulting price of SUVs and quantity sold in the market? What is the SDWL of this policy?

   d) An enterprising economics student proposes instead that there should be a “middle-man” who buys from the producers, and then sells the SUVs to consumers. What price will this middle-man pay to the producers? What price will he then charge to consumers? What is the resulting SDWL?

   e) How would you rank these four policies in terms of preference? (competition, SUV ban, monopoly, middle-man) What criteria are you using?