1. **Herfindahl-Hirschman Index**

An industry produces 3,840 trucks every year. The largest firm produces 870, and the next five largest firms produce 720, 390, 180, 120, and 60 trucks respectively. The remaining 100 firms each produce 15 trucks per year.

   a. Calculate the Herfindahl-Hirschman Index (HHI) for the industry.
   b. Is this industry highly concentrated, moderately concentrated, or not concentrated?
   c. The second- and third-largest firms now merge. Calculate the new HHI and the change in the HHI.
   d. By the standards of the U.S. Justice Department, would this merger be “presumed likely to enhance market power”?

2. **Heroin**

The market demand curve for heroin is said to be highly inelastic: addicts simply have to have their fix, it seems. Heroin supply in the U.S. is also said to be monopolized by the Mafia, which we assume to be interested in maximizing profits. Are these statements consistent? Explain.

3. **Monopoly**

A monopolist has a cost function given by $c(y) = 10y$. What are the optimal levels of output and price, and the level of profit, if:

   a. the demand curve is given by $D(p) = 100 - 2p$
   b. the demand curve is given by $D(p) = 10p^2$ [That’s 10 times $p$ to the power of minus 3.]
   c. the demand curve is given by $D(p) = 100/p$ [Think carefully about this one]
   d. Now return to case a., so $D(p) = 100 - 2p$. But now $c(y) = 200 + 20y$. Find the optimal levels of output and price, and the level of profit.
   e. In case d., there is a concern that the monopolist is charging too much, and so the government puts a price ceiling of $25. Find the new optimal level of output, and the level of profit, for the monopolist.

4. **Propane subsidies**

Senegal, a small country, buys propane (for cooking) on the world market, partly because there is no domestic production of propane. To encourage households to cook with propane instead of wood (which is scarce and polluting), the country is considering subsidizing imports of propane. Use a demand and supply analysis to show the effect of such a subsidy on the price paid by consumers, and the quantity demanded and supplied.
5. **Tax incidence in the long- and short-run**

Consider a perfectly competitive constant-cost industry in long-run equilibrium, which produces toothbrushes that currently sell at an equilibrium price of $2.00 each.

a. The government introduces a tax of $0.50 per toothbrush; the proceeds are to be used for “dental education.” Explain, with the aid of appropriate diagrams (for both a typical firm, and the industry) why, in the short-run, the price paid by consumers for toothbrushes will rise by less than $0.50, but in the long-run the prices will rise by $0.50.

b. Suppose that the tax were levied at a percentage rate (rather than a fixed “specific” rate per toothbrush) of 25%. How would the diagrammatic analysis differ from that of 5.a.?

6. **Deadweight loss of a land tax**

Suppose that the supply curve is vertical – as it would be for land, for instance. What is the deadweight loss of a tax in this market?

Write a short paragraph about Henry George, and why he favored using a land tax?