1. Consider the color TV problem without constraints (Example 2.1). Because the company's assembly plant is located overseas, the U.S. government has imposed a tariff of $25 per unit.

(a) Find the optimal production levels, taking the tariff into consideration. What does the tariff cost the company? How much of this cost is paid directly to the government, and how much represents lost sales?

(b) Would it be worthwhile for the company to relocate production facilities to the U.S. in order to avoid the tariff? Assume that the overseas facility can be leased to another manufacturer for $200,000 per year and that the cost of constructing and operating a new facility in the U.S. would amount to $550,000 annually. The construction costs have been amortized over the expected life of the new facility.

2. A local daily newspaper has recently been acquired by a large media conglomerate. The paper currently sells for $1.50/week and has a circulation of 80,000 subscribers. Advertising sells for $250/page, and the paper currently sells 350 pages/week (50 pages/day). The new management is looking for ways to increase profits. It is estimated that an increase of ten cents/week in the subscription price will cause a drop in circulation of 5,000 subscribers. Increasing the price of advertising by $100/page will cause the paper to lose approximately 50 pages of advertising per week. The loss of advertising will also affect circulation, since one of the reasons people buy the paper is for the advertisements. It is estimated that a loss of 50 pages of advertisements per week will reduce circulation by 1,000 subscriptions.

(a) Find the weekly subscription price and the advertising price that will maximize profit. Use the five-step method, and model as an unconstrained optimization problem.

(b) Examine the sensitivity of your conclusions in part (a) to the assumption of 5,000 lost sales when the price of the paper increases by ten cents.

(c) Examine the sensitivity of your conclusions in part (a) to the assumption of 50 pages/week of lost advertising sales when the price of advertising is increased by $100/page.