1. Recall exercise 1 from Chapter 5 in which an increase in the toll on a highway from $.40 to $.50 would reduce use of the highway by 5,000 cars per week.

a. **Because of the reduced use of the highway, demand in the secondary market for subway rides increases. Assuming that the price of subway rides is set equal to the marginal cost of operating the subway and marginal costs are constant (i.e., the supply schedule is horizontal), and no externalities result from the reduced use of the highway and the increased use of the subway, are there additional costs or benefits due to the increased demand for subway rides? Why or why not?**
b. **Because of the reduced use of the highway, demand in the secondary market for gasoline falls – indeed, by 20,000 gallons per year. There is a stiff tax on gasoline, one that existed prior to the new toll. Assuming that the marginal cost of producing gasoline is $1 per gallon, that these marginal costs are constant (i.e., the supply schedule is horizontal), that no externalities result from the consumption of gasoline, and that the gasoline tax adds 30 percent to the supply price, are there any additional costs or benefits due to this shift? If so, how large are they?**

1.a. No additional costs or benefits result from the outward shift in the demand curve for subway rides. Although the shift in demand implies that the subway is now more highly valued, the increase in highway tolls makes neither current subway riders nor new subway riders better off. Any effects in the secondary market for subway rides are already fully incorporated into the primary market demand curve of highway users.

1.b. As long as there are no changes in prices in the secondary market for gasoline, the leftward shift in the demand curve for gasoline causes no changes in consumer or producer surplus in the market that are not fully captured in the estimates of net benefits in the primary market. However, the tax on gasoline distorts the market. As a result, there are effects of the increased toll that occur in the gasoline market that are not measured in the primary market. Specifically, the government loses 30 cents on each gallon reduction in gasoline sales. Thus, the government's total annual reduction in tax revenues from gasoline sales is equal to ($.30)(20,000) = $6,000. This is a social cost that should be included in estimating the total effect of the increase in the toll.