Problem 1:

In a City only taxicabs and privately owned automobiles are allowed to use the highway between the airport and downtown. The market for taxi cab service is competitive. There is a special lane for taxicabs, so taxis are always able to travel at 70 km per hour. The demand for trips by taxi cabs depends on the taxi fare P, the average speed of a trip by private automobile on the highway E, and the price of gasoline G. The number of trips supplied by taxi cabs will depend on the taxi fare and the price of gasoline.

a. How would you expect an increase in the price of gasoline to shift the demand for transportation by taxi cabs? How would you expect an increase in the average speed of a trip by private automobile to shift the demand for transportation by taxi cabs? How would you expect an increase in the price of gasoline to shift the demand for transportation by taxi cabs?
b. Suppose the demand for trips by taxi is given by the equation Qd = 1000 + 50G – 4E – 400P. The supply of trips by taxi is given by the equation Qs = 220 – 30G + 100P. On a graph draw the supply and demand curves for trips by taxi when G = 4 and E = 50. Find equilibrium taxi fare.
c. Solve for equilibrium taxi fare in a general case, that is, when you do not know G and E. Show how the equilibrium taxi fare changes as G and E change.

Problem 2:

Consider the following demand and supply relationships in the market for golf balls: Qd = 90 – 2P – 2T and Qs = -9 + 5P – 2.5R, where T is the price of titanium, a metal used to make golf clubs, and R is the price of rubber.

a. If R = 2 and T = 10, calculate the equilibrium price and quantity of golf balls.
b. At the equilibrium values, calculate the price elasticity of demand and the price elasticity of supply.
c. At the equilibrium values, calculate the cross-price elasticity of demand for golf balls with respect to the price of titanium. What does the sign of this elasticity tell you about whether golf balls and titanium are substitutes or complements?

Problem 3:

Consider the market for crude oil. Suppose the demand curve is described by $Qd = 100 - P$, where Qd is the quantity buyers will purchase when the price they pay is P (measured in dollars per barrel). The equation representing the supply curve is $Qs = P/3$, where Qs is the quantity that producers will supply when the price they receive is P. The market for crude oil is initially in equilibrium, with no tax and no subsidy. Because it regards the price of oil as too high, the government wishes to help buyers by announcing that it will give producers a subsidy of $4 per barrel. A local television station reporter announces that the subsidy should lower the price consumers pay by $4 per barrel. Analyze the reporter's claim by determining the price buyers pay before and after the subsidy, and provide intuition to explain why the reporter is correct or incorrect.

Problem 4:

In a competitive market, there is currently no tax, and the equilibrium price is $40. The market has an upward-sloping supply curve. The government is about to impose an excise tax of $5 per unit. In the new equilibrium with the tax, what price will producers receive and consumers pay if the demand curve is:

a. Perfectly elastic?
b. Perfectly inelastic?

Illustrate your answers graphically.

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