∂ 10. Suppose the demand for towels is given by $Q^D = 100 - 5P$, and the supply of towels is given by $Q^S = 10P$.

a. Derive and graph the inverse supply and inverse demand curves.

b. Solve for the equilibrium price and quantity.

c. Suppose that supply changes so that at each price, 20 fewer towels are offered for sale. Derive and graph the new inverse supply curve.

d. Solve for the new equilibrium price and quantity.

e. Show that the laws of demand and of supply hold using calculus.

f. Suppose that a towel rack is a complement to towels. The expanded demand curve for the towels then is $Q^D = 150 - 5P - P_R$, where P_R is the price of the towel rack. Suppose that this current price of a towel rack is \$50. Show that this expanded demand curve is consistent with the demand relationship given in the setup to the problem.

g. If the price of towel racks increases to \$60, what is the equation for the new demand curve? In which direction has the demand curve shifted?