12. Consider the market for van Gogh paintings and assume no forgeries are possible.

   a. Is the supply of van Gogh paintings somewhat elastic, somewhat inelastic, perfectly elastic, or perfectly inelastic? Why?
   b. Draw the supply curve for van Gogh paintings.
   c. Suppose there are only 10 van Gogh paintings in the world, and the demand curve is $Q = 50 - 0.5P$. What is the equilibrium price?
   d. A tragic fire destroys five of the paintings. What is the new equilibrium price?
   e. Suppose that the demand curve for van Gogh paintings also can be written in expanded form as the function of the price of paintings by Gauguin (P_G): $Q^D = 10 - 0.5P + 2P_G$. Further suppose that the price of a Gauguin is 20, and show that this demand curve is consistent with the demand relationship given in part (c).
   f. Use calculus to argue whether Gauguin paintings are substitutes or complements to van Gogh paintings.
   g. If the price of Gauguins decreases to 15, what is the equation for the new demand curve? In which direction has the demand curve shifted?