Question 1 on this assignment is due in class on Thursday November 30, 2006. You may work together but should not copy answers verbatim and must hand-in individual assignments. Assignments will not be returned so make a copy of what you turn in.

1. This question refers to the production technology \( y = K^{1/2}L^{1/2} \).
   a. Derive the short run supply function for each firm in this industry. Assume each firm uses fixed capital stock of 25 units.
   b. Derive the short-run market supply curve if there are 20 firms operating in the industry.
   c. If market demand is \( y = (1000 - p) \) and \( w = r = 1 \), derive the short run competitive equilibrium (i.e. equilibrium price and quantity traded). Are profits or losses being made?
   d. What will be the long run competitive equilibrium price in this industry? What is long run quantity demanded?
   e. Do you know how many firms will operate in the long run? (Hint: We do not know. Why not?)

2. You are the manager of a donut firm (honey-dipped only) operating in a perfectly competitive market with short-run total cost given by \( 100 + q^2 \) and \( q \) is in units of 12 (dozens).
   a. If the price of a dozen donuts is $60 how many dozen donuts should you produce to maximize profits? What are your profits?
   b. What is your shut-down condition? In other words, what is the minimum price at which you would continue to produce in the short run?
   c. Explain what happens in the long-run in this industry. Specifically, what will the price be in the long-run? Will all firms produce the same amount of donuts?
   d. Say the donut industry is currently in long-run equilibrium as described in (c). Say there is an exogenous increase in demand for donuts caused by rumors that donuts are favored by famous public policy analysts. Explain the short run (initial) and long run consequences of this ‘shock’. Use detailed graphs please.