PROBLEM SET #7: PERFECT COMPETITION

Notes: If the total cost function of a firm has the form $TC = a + bq + cq^2$, then the marginal cost of the firm is $MC = b + 2cq$.

1. Suppose Bella's Birkenstocks produces sandals in the perfectly competitive sandal market. The total cost of production in the short run is $STC = 64 + q^2$. The long run total cost $LTC$ is also $64 + q^2$, except that $LTC = 0$ at $q = 0$ in the long run (i.e. $LTC(0) = 0$, $LTC(1) = 65$, $LTC(2) = 69$ etc.).

a. What are SATC, SAVC and SMC?

b. If the price of sandals is $32, what is Bella's production? What is her economic profit?

c. If the price for sandals were $8, what is Bella's production? What is her economic profit? Should she shut down?

d. Is there any price which would cause Bella to shut down in the short run?

e. What is Bella's short run supply curve?

2. In the short run there are 19 other sandal producers, each with the same costs as Bella.

a. What is industry output at a price of $32?

b. What is the industry short run supply curve?

c. If the demand for sandals is $Q = 640 - 10P$, how many sandals are sold in the short run with 20 producers? What is the profit earned by each company?

d. If the sandal industry is a constant cost industry in the long run, what is the long run price and quantity. How many firms are there in the industry?

e. Is the constant cost assumption reasonable?

3. Which of the following industries will be constant cost competitive industries, and which increasing cost.

a. Wheat production?

b. Wine production?

c. Paper clip production?

d. Paper cup production?
4. What is **producer surplus** in a constant cost competitive industry in the long run? Explain.

5. The US shirt industry is perfectly competitive and is in long-run equilibrium. There are 10 firms each with a total cost function of \( STC = 9 + q^2 \). The long run total costs are the same except that the fixed costs are not incurred if the firm does not produce. The number of firms is fixed in the short run, but can change in the long run. Imports are supplied with infinite elasticity at \( P = $8 \).

   a. Draw the long run average and marginal cost curve of one US firm. At what quantity is LAC minimized?

   b. Assuming the industry is constant cost in the long run draw the domestic industry long-run supply curve. On the same graph draw the domestic industry short-run supply curve.

   c. Draw the short-run and long-run total supply curve (including imports).

   d. Suppose the demand curve is \( Q_d = 150 - 10P \). What is price, quantity supplied domestically, and imports in the short-run? In the long-run?

   e. Describe the adjustment process from the short-run to the long-run.

   f. Patrick Buchanan proposes banning shirt imports. Who would gain and who lose in the short-run? What would be the short-run deadweight loss?

   g. Answer part (f) for the long-run.

6. Suppose that in NYC the daily demand for taxi rides is \( Q = 2100 - 100P \) where \( P \) is the price in $. Suppose also that the daily cost of operating each cab is a fixed $100 dollar rental cost per vehicle, plus a variable cost of \( q^3/100 \), where \( q \) is the number of cab rides per cab per day.

   a. What is the long run total cost function of each cab?

   b. If the market is a constant cost competitive one, what is the long-run price of a cab ride, the number of rides each cab supplies and the number of cabs operating?

   c. What is consumer surplus and producer surplus in the taxi cab market?

   d. Does the market achieve the condition for efficiency that \( p = mc \). Explain.

   e. Suppose that a tax of $3 per ride is imposed. What is the new market price, number of rides per day, and number of cabs?

   f. What is the deadweight cost of the tax per day?