Homework Policy Goods for all

Study You can study the homework on your own or with a group of fellow students. You should feel free to consult notes, text books and so forth.

The quiz will be available Wednesday at 5pm. Following the Honor code, you should find 20 minutes and do the quiz, by yourself and without using any notes. Paper and pen should be all you need. Then turn it in by Thursday 5pm. (drop off in box in front of Baxter 133). It will include one question from each section

The answers to the whole homework will be available Friday at 2pm.

Definitions
Please explain each term in three lines or less

- Variable cost
- Diseconomies of scale
- Free entry exit
- Long run equilibrium
- Long run competitive equilibrium model
- External economies of scale
- Short run total cost
- Shutdown point

Word problems
Please explain each question in a few sentences.

- Draw typical ATC, AVC, and MC curves for a profit maximizing, price taking firm. Show the case where price equals to average total cost and the rectangles that represent fixed costs and variable costs. What happens to the size of these areas as the market price increases? Show this in your diagram.

- If Price<ATC, firm should shut down. True or false?
Consider a cost function of producing an output $q$ of the form $c(q) = q^2 + 2q + 64$. Determine:

a. Marginal cost
b. Average cost
c. Average variable cost
d. Assume this product is produced only by that firm. What is the long run equilibrium price?

Suppose corn farmers in the US can be represented by a competitive industry with no economies or diseconomies of scale. Describe how this industry would adjust to an increase in demand for corn. Explain your answer graphically; showing the cost curves for the typical farmer as well as the market supply and demand curves for short run and long run.

### Technical problems

1. Each firm in an industry has the long run cost function

   $$TC(y) = \begin{cases} 
   0 & \text{if } y = 0 \\
   1000 + 10y^2 & \text{if } y > 0.
   \end{cases}$$

   The aggregate demand function for the output of the firms is $Q = 5000 - 2p$. Find the long run equilibrium price, number of firms, and output of each firm.

2. The market for xylophones is perfectly competitive, and all firms have the production function,

   $$x = K^{1/3}L^{2/3},$$

   where $x$ is the quantity of xylophones produced, $K$ is the capital input, and $L$ is the labor input. Cost of labor, $w=4$ and cost of capital, $r=16$. The market demand curve for xylophones is given by

   $$X^d = 2500 - 5(p_x)^2.$$  

   (a) If a firm’s capital stock is fixed at one unit in the short run, $K = 1$, find the equation for the firm’s short-run supply curve.

   (b) Suppose that, in the short run, there are 720 firms, each with one unit of capital, $K = 1$. Calculate the short-run equilibrium values of $p_x$ and $x$.

   (c) In the long run, firms can choose the values of both $K$ and $L$, and can freely enter or exit the industry. Calculate the long-run equilibrium values of $p_x$ and $x$. 