Assignment #7
Economics 101 – Section 5
Due Date: Thursday April 1, 2004

Instructions: Complete all questions and sub questions on separate sheets of paper. Make sure to include your name (first and last) and your student number on the first page of your assignment. Staple all sheets together and turn in to my office by the due date.

1. This set of questions deals with the principal agent problem.
   a) What are the goals of the firms manager and shareholders?
   b) What are the goals of the firms workers?
   c) What is the specific problem we are referring to when we talk about the "principal-agent problem"?
   d) When a contract does not entice a worker to exert a high level of effort what is one possible change to the workers pay scheme that could induce them to work harder?

2. The following table gives information about the demand and total cost for different levels of production for two different firms:

	Firm A		**Firm B**	
Quantity	Price	Total Cost	Price	Total Cost
0	-	$ 250	-	$ 500
1	$ 125	$ 400	$ 500	$ 700
2	$ 100	$ 500	$ 400	$ 900
3	$ 75	$ 550	$ 300	$ 1,100
4	$ 50	$ 600	$ 200	$ 1,300
5	$ 25	$ 700	$ 100	$ 1,500

How much should each firm produce in the short-run? How much should each produce in the long-run?

3. At the optimal level of output (i.e where MR=MC) a firm has total revenue of $3500 per day and total cost of $7000 per day. If we are considering only the short-run, what should the firm do if:
   a) total fixed cost is $3,000 per day?
   b) total variable cost is $3500 per day?
   c) total fixed cost is $4000 per day?
   d) total variable cost is $6000 per day?
   e) total variable cost is $1000 per day?

4. The profit function for a firm is given by:

(1.1) $$\prod = P*q - c*q$$

The price for this firm is also a function of the firms output so that:

(1.2) $$P = a - b*q$$

a) Derive the firms profit function by substituting equation 1.2 into 1.1.

b) After deriving the profit function above you find using your calculus skill that the equations for marginal revenue and marginal cost are:

$$MR = a - 2b * q$$

and

$$MC = c$$

Use the relationships above for find a relationship for the optimal level of output. That is find the value of q (q*) which would maximize the firms profit. The value of q* you compute will be a function of a,b, and c.

c) If a=20, b=3, and c=2 what is the optimal amount of output?

d) Using the values given in c) plus the optimal quantity you computed, compute the firms level of profit.

d) Does this firm have any fixed costs?

e) Graph the MR and MC curves on the same graph and label the graph appropriately.

f) Total revenue is given by the function $TR = (a - b * q) * q$ and total cost is given by the function $TC = c * q$. Using the values in c, graph TR and TC as a function of q on the same graph. Using this graph what is the profit maximizing level of output?

5. Assume the market for blank cds is perfectly competitive and is in long-run equilibrium.

a) Draw the diagrams for both the market and a typical firm. Specifically show i) the equilibrium price and quantity for the market, and ii) MC, ATC, AVC, MR, and the demand curve for the firm.

b) You have a group of friends that are thinking of investing some money in a company which manufactures blank cds. In the past the company has done quite well and has shown some reasonable profits. However the industry is now in long-run equilibrium. Would you recommend to your friends to invest or not? Why?

c) Suppose there is a shift in demand away from blank cds to blank dvds. What will happen to the firm and the industry in the long-run? (Note that neither the firm nor the industry can easily switch production from blank cds to blank dvds without incurring very large costs)

d) Will the market supply curve be flatter or steeper in the short-run or the long-run and why?