Homework Exercises 4: Production and Cost

Question 1

The following table shows how many tax returns the accounting firm Hoodwink and Finagle can finish in a day, depending on the number of accountants they have. Assume the quantity of capital remains constant.

Accountants	Tax Returns per Day
0	0
1	5
2	12
3	17
4	20
5	22

a. Find the marginal product of each accountant.
b. Over what range of employment do you see increasing returns to labor? Diminishing returns?
c. Why might MP_L change as accountants are added in the context of an accounting firm.

Question 2

Clean 'n' Shine pays \$150 per day for each automated line it uses and pays its worker \$100 per day. Clean 'n' Shine (*short-run*) production technology is given in the following table. To determine its short-run cost structure, fill in the blanks in the table.

q	***K***	***L***	***TFC***	***TVC***	***TC***	***MC***	***AFC***	***AVC***	***ATC***
0	1	0							
30	1	1							
70	1	2							
120	1	3							
160	1	4							
190	1	5							
210	1	6							

a. Over what range of output does the firm experience increasing marginal returns to labor? Over what range does it experience diminishing marginal returns to labor?
b. As output increases, do average fixed costs behave typically as described in the lecture? Explain.
c. As output increases, do marginal cost, average variable cost, and average total cost behave typically as described in the lecture? Explain.
d. Looking at the numbers in the table, but without drawing the curves, is the relationship between *MC* and *AVC* as described in the lecture? What about the relationship between *MC* and *ATC*?

Question 3

Suppose a hamburger shop faces the following situations:

a. Which of the following short-run cost curves – average variable cost, average total cost, and marginal cost – would shift as a result of an increase in a lump-sum advertisement cost by \$300? Why? Show this in a graph. Label the graph as precisely as possible.
b. Which of these three short-run cost curves would shift as a result of an increase of the prices of burger meat? Why? Show this in a graph. Label the graph as precisely as possible.

Question 4

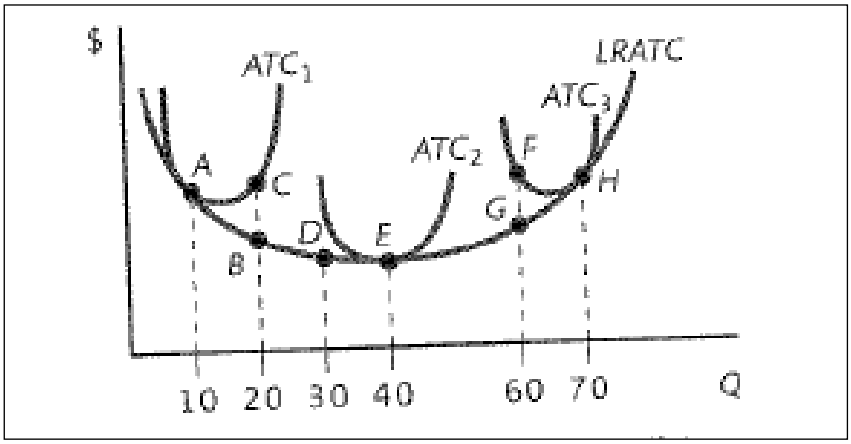
Computer chip factories ("fabs"). As the semiconductor are getting more advanced, the machines necessary to make them have become more expensive. According to an article in the *Economist*[1]:

"To reach the economies of scale needed to make such investments pay, chipmakers must build bigger fabs… In 1966 a new fab cost $14 million. By 1995 the price had risen to $1.5 billion. Today, say Intel, the cost of a leading-edge fab exceeds $6 billion."

Why do rising machine costs lead companies like Intel to build larger factories to expand output? (*Hint*: Think about the characteristic of the machines as a indivisible input and its implication on costs.)

Question 5

Ludmilla's House of Schnitzel is making 10 schnitzels a day (point A on the following diagram). Her partner, Hans wants her to double output immediately.



a. What point on the graph shows Ludmilla's cost if she tries to double production in the near future (i.e. short run)? Why?
b. If Ludmilla wants to keep making 20 schnitzels, what point should she aim for in the long run? How can she get there?
c. Later, Ludmilla and company do very well, expanding to making 70 schnitzels a day, but Ludmilla finds profits were better at 20. She wants to scale back by selling equipment and renting less space; Hans wants to shrink output just by using less flour and firing workers. Who is correct, and why? Use the graph to explain your answer.

Question 6

Analyzing the difficulties facing Japanese mobile phone makers, an analyst argue that Japanese firms made a mistake by focusing only on selling in high-income countries, not in low-income countries:

> The main growth in the wireless industry overall is in emerging markets, which need cheap phones. The world's top three makers – Nokia, Samsung and Motorola – focus on this segment. … Japanese firms are caught in a vicious circle: because they are not selling to poor countries, their volume stays low, which keeps prices high, which makes selling to poor countries infeasible.

Explain why the low volume production of Japanese firms would make them infeasible to set lower prices.[2]

[1] Source: The semiconductor industry: Under new management, *The Economist*, 2 Apr, 2009.
[2] Source: Dropped Call: Why Japan lost the mobile-phone wars, *The Economist*, 7 March, 2008.