Intermediate Microeconomics

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Homework 6

Due Thursday, 5th November

Question 1 New York Hipster Corporation produces Hipsters (h) using coffee (c) and fishing hats (f). their production function is $h = c^{\frac{1}{4}} f^{\frac{1}{2}}$. The cost of coffee is 2 and fishing hats is 3. they can sell hipsters for p_h each (note that we are not restricted to 'whole numbers' of coffee, fishing hats, or hipsters so we can, for example, have 0.75 of a fishing hat)

1. In the short run, the NYHC has leased $\bar{f}$ fishing hats, which they have to pay for however much they produce. Their only choice is how much coffee to buy. On one graph, show their total cost and total variable cost functions. On another, show their marginal cost, marginal revenue, average cost and average variable cost. What is their profit maximizing output (as a function of $\bar{f}$ and p_h)? Will they always make positive profits at that output? Will they ever choose to produce zero output?

2. In the long run, NYHC can pick both the amount of fishing hats and the amount of coffee they can use in production. Does the firm now have any fixed costs? Reproduce all the graphs from part 1, and recalculate profit maximizing output (this time as a function of p_h alone). How does the marginal and average costs in the short run compare to those in the long run? How does profit maximizing output compare?

Question 2 In class we showed that, for a firm that always produces at the point where its marginal cost equals price, the area under the supply curve is equal to total costs. Here we will show that this is also true for firms that stop producing below a certain price, as long as we draw the supply curve correctly.

1. Imagine that the firm has cost curves as shown in the first attached figure, and has no fixed costs (i.e. $c(0) = 0$). Sketch the supply curve of this firm. Show that the area under the supply curve is equal to the cost of production for any $x > x_1$

2. Now imagine the firm has fixed costs F, and its cost curves are as shown is the second attached figure. Sketch the supply curve of the firm. Does the area under the supply curve still equal the cost of production? If not, why not?

Question 3 Here are a set of things to prove:

1. For a firm with fixed costs, the marginal cost curve passes through the lowest point in the average cost curve AND the lowest point in the average variable cost curve

2. If we double the price of inputs to a firm then its cost function doubles at every level of output

3. A firm that faces fixed cost F will not change their output decision in response to a change in F

Question 4 (NOTE - you may find this question easier after Tuesday's class) Imagine that a firm has cost curves of the shape indicated in the figure for question 2 part 1 above, with no fixed costs. Imagine also that, $x_1 = 7$, $p_1 = 5$ and above x_1, marginal cost is given by $MC = 5 + 2(x - 7)$.

1. Sketch the supply curve for the firm.

2. Now imagine there are two firms in the industry, each with exactly the same cost curves. Sketch the industry supply curve. How does the area between the price line and the industry supply curve relate to the profits of the two firms

3. Imagine that demand is given by $35 - 2p$. How many firms can this demand support? What is the price at which demand equals industry supply?