University of California, Berkeley   Fall 2006

ECON 100A   Section 111, 112

13<u>th</u> Section   Cost of Production (Version 2)

We will work on a gigantic example for the coming two sections.

(In writing the solution I realize that the numbers I originally came up with produce a graph that span a very wide area; as a result the intersections of different lines are very hard to distinguish. I thus decided to scale down the numbers, which gives a graph with the same features but much better looking. I also added a few more parts to the example.)

You are a newly hired executive at Orange Computers, Inc., the manufacturer of the highly successful OrangePods. In the production of OrangePods two factors are used—machines (K) and workers (L), according to the production function $F(K,L) = L^{1/2}K^{1/2}$. The current rent for machine is 1 and wage rate is 1. In order to operate in the State of Nowhere OrangePods has to pay a lump-sum registration tax of 1 (million) dollars.

1. What it the total cost, in terms of K and L?

2. Derive the optimal long run combination of inputs for given amount of OrangePods q

3. What returns to scale does Orange Computer's production function exhibits?

4. Find the long run total cost, long run fixed cost and long run variable cost. Where does the fixed cost and variable cost come from?

5. What is the long run average cost and long run marginal cost? Verify that their intersection corresponds to the minimum of long run average cost.

6. Suppose Orange Computers has been producing 9 (hundred thousand) units of OrangePods for quite some time, so that it is using the optimal combination of inputs from above. Demand for OrangePods surged to 12 because it is expected to be out of production soon. It is too late to order new machines so the executives have decided to hire more workers. How many workers are needed?

7. Find the short run total cost, short run fixed cost and short run variable cost. Where does the fixed cost and variable cost come from?

8. Derive the short run average cost and short run marginal cost. Verify that their intersection corresponds to the minimum of short run average cost.

9. Steven, the CEO of Orange, plans to stay with the combination of inputs in part 4 in the future. Why would you think this is not the best idea on Earth? What would be a better plan?

10. Verify that the long run total cost curve, average cost curve and marginal cost curve intersect with their short run counterparts at a certain point. What is the rationale behind this result?