Intermediate Micro. Econ 3332 **Lazarev**

Homework 3.

Due November, 21. **15** points toward total grade.

Problem 1. = Chapter 7, ex. 9.

[When answering (a), keep in mind that marginal cost is the extra cost of producing one more unit of output (one more engine).]

After you're done with part (b), do the following (putting part c aside for a while):

d) Suppose there are four more plants like the plant described in this problem (let's call it *Plant A*). They belong to the same company, use identical technology (same production function.), but have different amounts of capital (assembly machines installed), namely: 4, 6, 15, and 20. Draw a diagram showing short-run production functions (i.e. output as a function of labor input only) for all five plants. Use this diagram to construct isoquants for this type of plants for the following output levels: 600, 2400, 3600.

e) Calculate which of the three levels of output (600, 2400, .3600) yields the highest profits for Plant A? How can you tell this from the isoquant diagram? (You will also need isocost lines to answer this question.)

f) Calculate the optimal number of labor teams to be employed by Plant A, using the algebraic optimality condition (marginal rate of technical substitution equals the ratio of factor prices). [Recall that marginal product of labor is the extra output produced by adding one more unit of labor (one more labor team, in our case) given fixed capital input, and marginal product of capital is the extra output produced by adding one more unit of capital given fixed amount of labor employed. They are easily obtained in this problem.]

g) Now proceed to part (c) of ex. 9. Ignore the last question. Answer the following instead: How many assembly machines will you recommend to install if the company needs a new plant of production capacity 15000 engines per week?

h) Soon after the new plant has been built following your recommendations (part g), machine rents increase by 50%. Show in a diagram how factor inputs (labor and capital) are going to be adjusted in this plant in the short run and in the long run. Assume that in the long run some machines can be removed from the plant.

Problem 2. = Chapter 12, ex. 3.

Problem 3. = Chapter 12, ex. 4.

Problem 4. = Chapter 13, ex. 7.