<u>Economics 11; Weekly Assignment Sheet for Week 8</u> -- Cost; The Price-Taking Firm

A. Text and workbook

   1. Text: ch.s 9,10; omit nothing.
   2. Study guide: ch.s 9,10; omit nothing.
      a. NOTE: The answers given in the back of the Study Guide to the following questions are
      <u>wrong</u> either in whole or in part (thus it is left to you, at least for now, to find the <u>right</u>
      answers!): p. 94, ALL application questions; p. 96, #7; p. 99, #16; p. 100, #18; p. 106,
      #s7,8,9; p. 107, #15; p. 108, 16,17,18.

B. Reading(s)

   1. In positing the existence of the "short run," economists in effect assume that firms may
   employ inefficient factor combinations at some points in time. How can this be reconciled with
   the hypothesis of profit maximization, or can it be?

C. Puzzles

   1. Suppose that a firm always produces the same amount of output. Further suppose that it is
   able instantaneously, without adjustment costs, to change the amount of capital and labor that it
   uses, so that the marginal rate of (technical) substitution between labor and capital is always
   equal to w/r, where w is the wage, r is the rental on capital, and capital is on the vertical axis of
   the isoquant map. Now consider the definition of the elasticity of input substitution, or "sigma"
   for short.
      a. Show that, for such a firm, sigma greater (less) than one means that a rise in the rental on
      capital [with a constant wage] will lead to a decline (an increase) in capital's share of the firm's
      total cost of production. The latter is given by [(rK)/(TC)], where K is the amount of capital
      employed and TC is the firm's total production cost.
         HINTS:
            1. Observe that TC = rK + wL, where L is the amount of labor employed.
            2. Note that a fall (rise) in [(rK)/(wL)] implies a fall (rise) in capital's share of output.
            3. Make thoughtful use of the fundamental definition of an elasticity as being the ratio
            of two percentage changes.

   2. Consider an economy which produces only wheat. There are three qualities of land: 50 acres
   of good land; 30 of fair land; and 40 of bad land. On good land, 2 man-years of labor employed
   on one acre yields 70 bushels of wheat per year; on fair land, 2 man-years of labor on an acre
   yields 50 bushels; and on bad land, 4 man-years of labor on an acre yields 30 bushels.
      NOTE: The production function for each type of land is characterized by a zero elasticity of
      substitution; isoquants are right angles. For example, it is not possible to produce more (less)
      than 70 bushels on an acre of good land using more (less) than 2 workers. This simplifying
      assumption is required to make the problem tractable.

a. Plot the marginal product of labor as a function of the number of workers in the economy.

b. Suppose there were 200 workers in the economy: what is the wage (in bushels per year)? What rent (in bushels per acre per year) would be paid on each type of land? Why would it be paid?

c. Show that the rent on good land is equal to the marginal product of that land.

    HINT for all parts above:

        1. Suppose that resources are allocated efficiently in this economy (why wouldn't they be!?). Then they would have to be allocated so as to maximize the output of wheat! Use this principle to determine the allocation of labor to land; then tell a story about how peoples' (laborers, land owners) behavior in reaction to appropriate factor (labor, land) would achieve and sustain this allocation.