

Microeconomics for Management - Yossi Spiegel

Problem set 6

Problem 1

A firm uses two factors of production to produce a single output and its production function is given by $q = \text{Min}\{x_1, x_2/b\}$.

- (a) Illustrate the firm's isoquants in a graph that has x_1 on the horizontal axis and x_2 on the vertical axis.
- (b) Compute the marginal product of each factor (note: the marginal product of factor 1 depends on the quantity of factor 2 that the firm has and vice versa).
- (c) Suppose the firm has 10 units of factor 1. Illustrate in a graph the firm's output as a function of x_2 .
- (d) Does the production function exhibit increasing, decreasing, or constant returns to scale?

Problem 2

- (a) Repeat your answer to Problem 1 under the assumption that the firm's production function is given by $q = x_1 + 2x_2^{1/2}$.
- (b) Compute the technical rate of substitution.

Problem 3

A firm uses two factors of production to produce a single output. The firm's technology exhibits constant return to scale. In 1999, the firm used 10 units of factor 1 and its output was 200 units. In 2000, the firm used 20 units of factor 1 and its output was 500 units. The quantity of factor 2 was the same in 1999 and in 2000 although the firm could have selected different quantities of factor 2 had it wanted to. Can you tell, using this information, whether the firm was minimizing its costs in 1999 and in 2000? Explain your answer. (Hint: try to think, using the information you have, whether the firm was able to produce the same quantity it did, using a smaller quantity of inputs).