

The Ohio State University  
Department of Economics  
Econ 501.02 Prof. James Peck  
**Homework #3 (due Tuesday February 17)**

1. Consider the following production function

$$x = \frac{5KL}{K+L}.$$

Suppose that input prices are given by  $w = 4$  and  $r = 1$ .

- (a) Find the conditional demands for  $K$  and  $L$ , as a function of  $x$ .  
(b) What is the firm's long run average cost function?

2. Suppose the firm has the production function of problem 1,  $x = \frac{5KL}{K+L}$ , and that input prices are given by  $w = 4$  and  $r = 1$ . Also suppose capital is fixed at 4 units,  $\bar{K} = 4$ .

(a) Compute the firm's short run average total cost, average variable cost, and marginal cost functions.

(b) (This is challenging. Don't spend too much time on this.) First find the value for  $x$  that minimizes short run average total cost. Now substitute that value of  $x$  into the following functions, and show that they take on the same value: short run average total cost, short run marginal cost, and long run average total cost.