Microeconomic Theory I

Problem set 6 due date:
Tuesday, October 29 in class

Instructions: Please clearly identify your solution with **bold** or by circling so that I can easily see your answer. Print your entire name at the top left of every page. I will not accept late assignments. Staple or paperclip your answers to this handout. Write legibly.

Concentrate on the following production function:

$$q = f(K, L) = \frac{KL}{(K + L)} \tag{1}$$

1. Derive conditional input demand functions, generalized long-run total cost, marginal cost and average cost as functions of v, r, and q.
2. Find $\lambda(v, w, q)$ from the Lagrange equation, interpret it as a marginal function and show that your interpretation is correct.
3. Assume $w = \$1$ and $v = \$4$. What is the long-run total, average and marginal costs as a function of output?
4. For the following questions, assume that $w = \$1, v = \$4$ and $\bar{K} = 4$ units in the short-run.
   (a) Derive the short-run variable cost, average variable cost, total cost, average total cost and marginal cost as functions of output.
   (b) Show that the following four functions take on equal values at minimum short-run average total cost: short-run average total and marginal costs and long-run average and marginal costs.