

Econ 30010
Intermediate Microeconomic Theory
Cost Practice Problems

Production Functions to be used in the following problems.

A. $q = 50 L^{1/4} K^{1/5}$

B. $q = KL + L^2$

C. $q = 75LK$

D. $q = 30L^{1/3} K^{2/3}$

E. $q = 4L + 3K$

1. Cost Minimization

Find the cost minimizing input combination for each set of production function, factor prices, and output level.

- a. Production function A, $q = 1000$, $w = 2$, and $r = 5$.
- b. B, $q = 500$, $w = 6$, and $r = 1$.
- c. C, $q = 650$, $w = 3$, and $r = 4$.
- d. D, $q = 10000$, $w = 2$, and $r = 2$.
- e. E, $q = 40$, $w = 7$, and $r = 10$.

2. Long-run Cost Functions - For each production function/factor price combination in section 1, derive the long-run cost function.

3. Short-run Cost Functions - For each production function/factor price combination in section 1, derive the short run total cost function given the associated restriction below. Then derive the formulas for fixed costs, variable costs, and marginal costs.

- a. (a) plus $K=5$.
- b. (b) plus $L=10$.
- c. (c) plus $L \geq 20$.
- d. (d) plus $L \geq 10$ and $K \geq 5$. (This is a challenging problem.)
- e. (e) plus $K \geq 24$.

4. Recover the input demands and the technology for a firm with cost function $TC(q) = 2\sqrt{rwq} - 3r$.