Econ 30010  
Intermediate Microeconomic Theory  

Additional Cost 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. (e) plus \( K \geq 24 \).