

Final
Econ 504
Fall 2007

For credit, you must show and explain your work.

Name _____

1. A college is trying to decide what combination of three fuel sources (oil(O), wood (W), and coal (C)) to use in its heating plants. E_0 is the amount of energy the college wants to produce, $F(O, W, C)$ is the energy production function and the college is a perfect competitor in the fuel markets. Assume that O, W, and C can take on any values and that the college's budget constraint is binding. How is the conditional demand for wood and coal affected by a government subsidy for wood?

2. Maximize

$$f(x, y) = \ln(x + 2) + \ln(Y + 1) - x - \frac{1}{2}y$$

subject to non-negativity constraints and the constraint

$$6x + 2y \leq 4$$

This problem will satisfy second order conditions and the quantity constraint, so you do not have to consider them.

3. Given the production function $Q = AK^\alpha L^\beta$, show that $\alpha + \beta < 1$ implies decreasing returns to scale.

4. A consumer has the strictly quasiconcave indirect utility function

$$u = v(m_1) + \beta v(m_2), \quad 0 < \beta < 1$$

where m_t is income available for expenditure on consumption in period $t = 1, 2$. Her wealth constraint is

$$m_1 + \frac{m_2}{1+r} = \tilde{m}_1 + \frac{\tilde{m}_2}{1+r}$$

where r is the interest rate at which she can borrow or lend and \tilde{m}_t is the exogenously endowed income in period t . Derive and interpret the Slutsky equations for the effect of changes in the interest rate on the choice of income in period $t = 1, 2$.

5. Prove the following property of the expenditure minimization problem: $e(p_1, p_2)$ is hom1 in prices.

