

Final
Econ 504
Fall 2006

Show your work.

Name _____

1. A firm sells its output in a perfectly competitive market. It hires labor in a perfectly competitive labor market at a wage w and rents capital in a perfectly competitive capital market at rental rate r . It has the production function $f(L, K)$, which is strictly concave and it seeks to maximize profit. What is the impact of a change in the price of capital, r , on the amount of labor and capital demanded?

2. Consider the expenditure minimization problem. Choose x_1 and x_2 to minimize $E = p_1x_1 + p_2x_2$ subject to $u(x_1, x_2) = u^0$. Show that $\frac{\partial E}{\partial p_i} = x_i$.

3. Maximize $f(y, z) = 2y^2 + 2y + 8z^2$ subject to $4y + 4z \leq 2$, $y \geq 0$, and $z \geq 0$. You may assume that the second order conditions are satisfied but should check that the constraint qualification is satisfied.

4. Prove that if a function is hom_1 then the first order partial derivatives are hom_0 . Interpret and explain this result, using an economic example.

5. Find the general solution of the following system of difference equations:

$$\begin{aligned}x_{n+1} &= 3x_n - y_n \\y_{n+1} &= -x_n + 2y_n - z_n \\z_{n+1} &= -y_n + 3z_n\end{aligned}$$

6. You are teaching a class. A student approaches you and says that they are having trouble solving the following problem.

$$-x - y - z = 0$$

$$x + y + z = 7$$

$$2x - 3y = 0$$

What explanation do you give to the student?

7. Solve the following maximization problem. Choose x_1, x_2 to maximize $U = x_1 + 2x_2$ subject to $p_1x_1 + p_2x_2 = m$. Interpret your answer.