

Problem Set 3

1. Find the comparative-static effect of a change in α :

$$\text{a) } \max z = x^{0.25} y^{0.75} \quad \text{subject to} \quad 2x + 4y = \alpha$$

$$\text{b) } \min z = 2x + 4y \quad \text{subject to} \quad x^{0.25} y^{0.75} = \alpha$$

2. Suppose a monopolist uses L workers to produce Q units of output:

$$\Pi(Q, L) = Q(a - bQ) - wL$$

where a, b are positive constants determining demand and w is the cost of labour. Given the production function $Q = 2L^{0.5}$:

a) Find the firm's optimal employment decision L^*

b) How does employment change as a and w change?

3. Consider the consumer problem

$$\min px + qy \quad \text{subject to} \quad x^{0.5} y^{0.5} = U^0$$

where U^0 is a fixed level of utility.

a) Find the consumer's compensated demand functions and check that the second-order conditions for a minimum are satisfied.

b) Derive the expenditure function e , and use the envelope theorem to show that $\partial e / \partial U^0 = \mu^*$.