

Assignment No. 3
Microeconomics I (Prof. Alberto Iozzi)

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Please return your answers by the beginning of the second practice (29/11/2019).

Exercise 1

Derive the profit function $\pi(p)$ and the supply function (or correspondence) $y(p)$ for the single-output technologies whose production functions $f(z)$ are given by

1. $f(z) = \sqrt{z_1 + z_2}$
2. $f(z) = \sqrt{\min\{z_1; z_2\}}$
3. $f(z) = (z_1^\rho + z_2^\rho)^{1/\rho}$, for $\rho \leq 1$ \square

Exercise 2

Let $f(z)$ be a production function of the form:

$$f(K, L) = AK^\alpha L^\beta \tag{1}$$

where K is capital, L is labour and A is the *Total Factor Productivity*.

1. Compute the *conditional demand functions*;
2. check whether the *conditional demand functions* are homogeneous in prices and which degree of homogeneity they exhibit;
3. find the optimal value of the *Cost Minimisation Problem*, that is, the *cost function* $c(w, q)$;
4. compute the demand for L in the *short run*;
5. compute the *Short run cost function*;
6. derive the *Long run marginal cost*, the *Long run average cost*, the *Short run marginal cost* and the *Short run average cost*. \square

Exercise 3

Let $f(z)$ be a production function of the form:

$$f(z) = \frac{1}{2} \left(\ln(z_1) + \ln(z_2) \right) \quad (2)$$

1. Find the equation for the isoquant when $q = \bar{q}$;
2. compute the *Marginal Rate of Technical Substitution*;
3. compute the elasticity of substitution σ_{ij} , $i \neq j$. \square

References

- Mas-Colell, A., Whinston, M. D., & Green, J. R. (1995). *Microeconomic theory*. Oxford University Press.
 - Chapter 5: **Production**.
- Cowell, F. (2018). *Microeconomics: principles and analysis*. Oxford University Press.
 - Chapter 2: **The firm**.