Advanced Microeconomics - Problem set 1
Due date: classes on October 16, 2018

Problem 1 *Compute supply and profit as functions of the price vector (p_a, p_b) for the following production set:*

$$Y = \{(a, b, c) \in \mathbb{R}^3 | a \leq 0, b \leq 0, c \leq \min\{-\alpha a, -\beta b\}^\gamma\}, \quad \text{where } \alpha, \beta, \gamma > 0.$$

Problem 2 *In a three-commodity economy, we consider a producer whose cost function is*

$$C(p_a, p_b, c) = 2c^2 p_a^{\frac{2}{3}} p_b^{\frac{1}{3}}.$$

Compute supply and profit of this producer as functions of the price vector (p_a, p_b, p_c).

Problem 3 *In a two -commodity economy, we consider a producer with the following production set:*

$$Y_\alpha = \{(a, b) \in \mathbb{R}^2 | a \leq 0, b \leq \sqrt{-a + \alpha} - \sqrt{\alpha}\}, \quad \text{where } \alpha \geq 0.$$

a) *Determine profit and supply of this producer as functions of the price vector (p_a, p_b).*

b) *Assume that there is a second producer whose production set is Y_β with $\beta \geq \alpha$. What is the aggregate supply of this economy as a function of the price vector (p_a, p_b)?*

Problem 4 *In a three-good economy, a firm has two production units. The first one produces commodity C using commodity A as an input. The production set of this unit is:*

$$\{(a, b, c) \in \mathbb{R}^3 | a \leq 0, b \leq 0, c \leq |a|\}.$$

The second unit produces commodity C using commodity B as an input. The production set of this unit is:

$$\{(a, b, c) \in \mathbb{R}^3 | a \leq 0, b \leq 0, c \leq b^2\}.$$

a) *Determine the iso-output set, i.e. the set of input baskets for which the output is at least c, where $c \geq 0$ is some given value.*

b) *Compute the cost function and the demand of inputs as functions of the vector (c, p_a, p_b).*

c) *Compute the supply of this firm as a function of the price vector (p_a, p_b, p_c).*