Inside Class 3

1. A company wants to derive a model, on how many of the employees N_j it hires at a given year j are expected to stay for less than a year (call this number K_j), for 1-5 years (call this number L_j), or for more than 5 years (call this number M_j), where clearly $K_j + L_j + M_j = N_j$. The model it considers is a fractional model, where if the fractions are λ_1, λ_2, and λ_3, the corresponding predicted numbers would be $\lambda_1 N_j$, $\lambda_2 N_j$, and $\lambda_3 N_j$, respectively. Assume the company has collected the values of K_j, L_j, M_j, and N_j over the past n years. Write a linear program that enables to derive such a model using the available data. *Hint. You can choose an objective function that you find appropriate.*

2) Consider the two hyperplanes

$$H_1 = \{ x \mid a^T x = b_1 \} \quad , \quad H_2 = \{ x \mid a^T x = b_2 \}$$

with the same normal vector a.

Show that their distance equals

$$\frac{| b_1 - b_2 |}{\| a \|_2}$$