Wiskundige Analyse 2, Huiswerk 23-05-2012

Consider the ellipse

$$E : \frac{x_1^2}{a^2} + \frac{x_2^2}{b^2} = 1$$

and the straight line

$$L : x_1 + x_2 = 1.$$

(i) Find a necessary and sufficient condition on a and b such that E and L have no points in common.

(ii) Given this condition, find the minimal distance between points of E and L.

(iii) Suppose $p \in E$ and $q \in L$ are such that $\text{dist}(p,q)$ is minimal: what can you say about the vector $p-q$?