Problem 1: Define the distance between two sets \( E, F \subset \mathbb{R} \) as
\[
d(E, F) = \inf \{|x - y| : x \in E \text{ and } y \in F\}.
\]
Show that if \( E \) is compact, \( F \) is closed and \( E \cap F = \emptyset \), then \( d(E, F) > 0 \).

Problem 2: Let \( E \subset [0, 1] \) be a set with \( m^*(E) = 0 \) and let \( f : [0, 1] \to \mathbb{R} \) be a Lipschitz function. Show that \( m^*(f(E)) = 0 \).

Problem 3: Give an example of a set \( E \) that satisfies the following property:
\[
m^*(E) \neq \sup \{m^*(U) : U \subset E, U \text{ is open}\}.
\]

Problem 4: Chapter 1.6, Problem 50.

Problem 5: Chapter 1.6, Problem 59.

Problem 6: Chapter 2.2 Problem 10.