I. From Abbott: 4.5.2, 4.5.3 (of course, you are supposed to prove your assertion!), 4.5.7, 5.2.3, 5.2.4.

Additional Problems

II.
A) Show that if \( f(x) \) is any polynomial of odd degree, then \( f \) has a real root (that is a real number \( c \) where \( f(c) = 0 \)).
B) Suppose that \( f(x) \) is a polynomial of even degree and that there exist \( a \neq b \) in \( \mathbb{R} \) such that \( f(a) < 0 < f(b) \). Show that \( f \) has at least two distinct real roots.
C) True or False: Any polynomial of even degree with a real root has at least two distinct real roots.

III. Show that the equation \( x^2 = 3^x \) has at least one real solution.

IV.
A) Suppose \( f \) is continuous on \([0, 1]\) with \( f(0) < 0 \) and \( f(1) > 1 \). Prove that there is at least one point \( c \in (0, 1) \) where \( f(c) = c^2 \).
B) Generalize your reasoning from part A to show that if \( f \) is as before and \( g \) is any continuous function on \([0, 1]\) with \( g(0) \geq 0 \), \( g(1) \leq 1 \), the there is at least one point \( c \in (0, 1) \) where \( f(c) = g(c) \).