1 Determining Countability
Determine whether each of these sets is finite, countably infinite, or uncountable. For those that are countably infinite, exhibit a one-to-one correspondence between the set of positive integers and that set.

a) the integers that are multiples of 7
b) the integers less than 100
c) the real numbers between 0 and \( \frac{1}{2} \)
d) the real numbers not containing 0 in their decimal representations
e) all bit strings not containing the bit 0
f) all positive rational numbers that cannot be written with denominators less than 4

2 Sets and Countability

a) Show that if \( A \) and \( B \) are sets, \( A \) is uncountable, and \( A \subseteq B \), then \( B \) is uncountable.
b) If \( A \) is an uncountable set and \( B \) is a countable set, must \( A - B \) be uncountable?