

## 2.5 - Worksheet

1. 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 greater than 10
  - b. the odd negative integers
  - c. the integers with absolute value less than 1,000,000
  - d. the real numbers between 0 and 2
  - e. the set  $A \times \mathbb{Z}^+$  where  $A = \{2, 3\}$
  - f. the integers that are multiples of 10
2. A tour bus with 40 people arrive at Hilbert's Grand Hotel looking for rooms. Can the night manager of the hotel accommodate them? How?
3. An infinitely large tour bus carrying a countably infinite number of passengers pulls up to Hilbert's Grand Hotel to rent rooms. Can the night manager accommodate them? How?
4. Give an example of two uncountable sets  $A$  and  $B$  such that  $A \cap B$  is
  - a. finite
  - b. countably infinite
  - c. uncountable