

**CSCI 241H:**  
**HOMEWORK 3**

Show your work.

1. You are given the following about the sizes of sets  $A$  and  $B$ :  $|A| = k$ ;  $|B| = l$ , and  $|A - B| = m$ . What is the size of  $P(A \cap B)$ ? Note that  $P(S)$  refers to the power set of set  $S$ .
2. Is it true that, if  $B \subseteq A$ , then  $B \cap C \subseteq A \cap C$  for all sets  $C$ ? Prove.
3. Show the following.
  - (a)  $(A - B) - C \subseteq A - C$
  - (b)  $(A - C) \cap (C - B) = \emptyset$
  - (c)  $(A \cup B) \subseteq (A \cup B \cup C)$
4. Show that there are as many numbers that can be written as decimal fractions (i.e., of the form  $a.b$  where  $a$  is an integer and  $b$  is a positive integer), as there are nonnegative integers and vice versa.