1) Let \( A = \{a, b\} \), \( B = \{x, y, z\} \) and \( C = \{p, q\} \). Find the following:
   a) \( A \times B \)  
   b) \( C \times B \)  
   c) \( C \times A \)

2) Prove or give a counter example.
Theorem: For all sets \( A \) and \( B \), \( A \times B = B \times A \)

3) Find the power set for:
   a) \( B = \{1, 2, 3, 4\} \)
   b) \( A = \{\emptyset, \{\emptyset\}\} \)

4) Given the power set \( P = \{\emptyset, \{y\}\} \), what was the original set?

5) If \( A = \{h, k, a, i, p\} \) and \( B = \{a, d, h, k, m\} \) find the symmetric difference \( A \oplus B \).

6) Draw Venn Diagrams to illustrate the following:
   a) \( (A - B) \cup C \)
   b) \( A^C \cap B \cap C^C \)
   c) \( (A - B) \cup (B - C) \)

7) If the Universal set \( U = \{a, b, c, d, e, f, g, h\} \) and \( A = \{a, d, e, f, h\} \) and \( B = \{b, c, d, e, f, g\} \) Find the following:
   a) \( A \oplus B \)
   b) \( A \cap B^C \)
   c) \( A - B \)
   d) \( A^C \cup B^C \)

8) If \( A \times B = \{(a, b),(b, b),(c, b),(a, a),(b, a),(c, a)\} \), find the elements in sets \( A \) and \( B \).

9) Using elements of sets, prove the following or give a counter example.
   a) For all sets \( A, B \) and \( C \), if \( A \subseteq B \) and \( C \subseteq B \), then \( A \cup C \subseteq B \)
   b) For all sets \( A \) and \( B \), \( (A \cup B)^C = A^C \cap B^C \)
   c) For all set \( A \) and \( B \), if \( A \subset B \) then \( B^c \subset A^c \)