Home work sec 5.1-5.3

Shows all work and clarify answers with complete sentences when needed.

1) Let A = \{a,b,c\}, B = \{x,y\} and C = \{1,2\}
   Find the following:
   a) A \times B \times C    b) C \times A \times B    c) C \times C

2) Given any two sets D and M, is it true that D \times M = M \times D. Why or why not?

3) Find the power set for:
   a) B = \{a,b,c,d\}
   b) A = \{\emptyset, \{\emptyset\}\}

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

5) If A = \{a,b,c,d\} and B = \{a,c,e,f,g\} find the symmetric difference A \oplus B.

6) Using elements of sets, prove one of DeMorgan's laws:
   \((A \cup B)^C = A^C \cap B^C\) or \((A \cap B)^C = A^C \cup B^C\)

7) Using algebra of sets verify the following.
   Given that the symmetric difference \( A \oplus B = (A - B) \cup (B - A) \) prove that
   \( A \oplus B = (A \cup B) - (A \cap B) \)

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

9) Using elements of sets, prove the following:
   \((A \times C) \cap (B \times D) = (A \cap B) \times (C \cap D)\)

10) Use set containment to develop a conclusion from the following statement.
    a) Good students attend class
    b) All bald headed people received a degree
    c) Poor students do not receive a degree.

    Conclusion?