Home work  sec 2.1-2.2

Shows all work and clarify answers with compete 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
   $A \oplus B = (A \cup B) - (A \cap B)$  (Be sure to give justification for each step)

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

11) Using algebra so sets, Prove the following and justify each step.

   1) $[A^C \cup (B - A)]^C \cap A = A$
   2) $A - (A - B) = A \cap B$