Home work sec 5.1-5.3

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
   \(A \oplus B = (A \cup B) - (A \cap B)\)

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?