Supplement Exercises 1

1. What is conditional proof, indirect proof, iff proof.
2. When is a conditional trivially true and when is it vacuously true.
3. Prove that if x=3n+7 and y=3m+7, where m and n are integers, then xy=3k+7 for some integer k.
4. What two properties characterize sets.
5. How do you show $A \subset B$.
6. How do you show $A \not\subset B$.
7. How do you show A=B.
8. Define the union AUB
9. Define the intersection $A \cap B$.
10. Defne the difference A-B
11. Define the symmetric difference $A \oplus B$
12. Define the complement of A'.
13. Write the inclusion exclusion formula for n sets.
14. Write power set for the given set.
    {a,b}, {a,ϕ}, {{ϕ},a,{b}}
15. What two properties characterize tuples.
16. What is the difference between lists and tuples.
17. What is the Cartesian product AXB.
18. Evaluate the expression {a,b}x{1,2,3}, head(tail(tail(<a,b,c,d,e>)))
19. Evaluate the bag expression: [a,a,b,c,d,d,d]U[a,b,b,c,c,d,d,d]
    $[a,a,a,b,c,d,d] \cap [a,b,b,c,c,d,d,d]$
20. Answer true or false to each statement: $\phi \in \phi$
    $A-(B \cap A)=A-B$
    $A \cap (BUA)=A$
    $A \oplus A=A$
21. For each integer n let $A_n=\{x|x \in Z \text{ and } -n \leq x \leq n\}$. Evaluate each of the following expressions:
    $A_4 \cap A_7=$
    $A_7-A_4=$
22. Let A, B and C be sets with the following cardinalities.
    |A|=|B|=|C|=200, |AUBUC|=385, $|A \cap B|$=35, $|A \cap C|$=95 and $|B \cap C|$=100. Evaluate the expressions, |A-B|, $|A \cap B \cap C|$.
23. Evaluate the expressions: $\{a,b,c\} U (\{a,b\} \cap \{b,c,d\})$
    $\{a,b,c\} \oplus \{a,b,c\}$
    $\phi \oplus A$