Group Assignment 4  
Venn diagrams

Learning Goals.
This activity covers two operations on two sets: union and intersection. You will learn to use Venn diagrams to represent the relationship between two sets.

Problem Report.
Hand-in this problem report at the end of the class meeting.

1. Ms. Thompson is an elementary school teacher having 15 students in her class. The set of members of the math club is \( A = \{\text{Anne, Amanda, Lisa, Nicole, Amy, Alex}\} \), and the set of members of the science club is \( B = \{\text{Sam, Tom, Mike, Dan, Nicole, Anne, Alex, Paul}\} \).

   a) Draw a Venn Diagram to represent this situation.

   b) What is \( A \cup B \)?

   c) What is \( A \cap B \)?

   d) Which region of the Diagram would contain students who are in the math club but not in the science club? (Make the shadow in your answer a))

   e) Describe a situation in which the members of \( A \cup B \) would be together after school?
2. Let $B$ and $C$ be sets. If $B \cap C = C$, what is the relationship between $B$ and $C$?

3. Which of the operations corresponds to 'and' and which corresponds to 'or'? What meaning of 'or' are we using here?

   - $A \cup B$
   - $A \cap B$

4. Let $A = \{1, 10, 100\}$, $B = \{10, 20, 30\}$, and $C = \{20, 25, 30\}$.

   a) What is $(A \cup B) \cap C$?

   b) What is $(A \cup B) \cap (A \cup C)$?

   c) What is $A \cup (B \cap C)$?

   d) Which two of the following are equal?

      $(A \cup B) \cap C$, $(A \cup B) \cap (A \cup C)$, $A \cup (B \cap C)$?
5. In a group of 50 students, 30 were taking a math class, 15 were taking an English class and 7 were taking both.
   a) Draw a Venn Diagram to represent this situation.
   b) How many people are not taking a math or an English class?
   c) Represent the set of students taking math, but not English using the necessary symbols for intersection, union and complement.

6. In a group of 120 students, 75 know how to use a Macintosh, 65 know how to an IBM-compatible computer and 20 do not know how to use either.
   a) Draw a Venn Diagram to represent this situation.
   b) How many people know how to use both?