

Math 1303 - Math in the Liberal Arts

Homework #4 - 2005.09.28

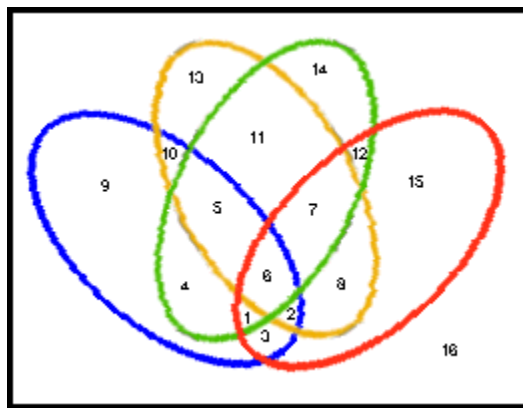
Due Date - 2005.10.10

Solutions

1. Let A , B and C be sets. Find a formula for $n(A \cup B \cup C)$.

$$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(A \cap C) - n(B \cap C) + n(A \cap B \cap C)$$

2. Draw a Venn diagram which accurately and uniquely represents ALL the possible intersections of 4 sets, A , B , C and D . *Hint: There should be 16 distinct regions!*



3. Using your diagram in problem 2, find a formula for $n(A \cup B \cup C \cup D)$.

The following is just one example of a solution, The form is similar to that of the answer to problem 1.

$$\begin{aligned} n(A \cup B \cup C \cup D) = & n(A) + n(B) + n(C) + n(D) - n(A \cap B) - n(A \cap C) \\ & - n(A \cap D) - n(B \cap C) - n(B \cap D) - n(C \cap D) \\ & + n(A \cap B \cap C) + n(B \cap C \cap D) + n(A \cap C \cap D) + n(A \cap B \cap D) \\ & - n(A \cap B \cap C \cap D) \end{aligned}$$

4. Draw a Venn diagram which accurately and uniquely represents ALL the possible intersections of 5 sets, A , B , C , D and E . *Hint: There should be 32 distinct regions!*

