Set Operations Combined

Areas in a Venn Diagram

- A Venn Diagram having 2 intersecting circles (sets) has 4 areas.
  - Each area in the diagram has a verbal description.
- A Venn Diagram having 3 intersecting circles has 8 areas.
  - Each area in the diagram has a verbal description.

Known Sets and Venn Diagrams

- Let U = {a, b, c, … , k}
  A = {a, c, e, g, i}
  B = {d, e, f, g, h}
  C = {a, b, d, f, j}
- Place the elements of A, B, and C in the correct areas of the diagram.

Venn Diagrams for Sets Whose Elements Are Not Known

- Sets whose elements are not known can be pictured in a Venn diagram.
- Steps to picture such a set.
  - Draw a diagram with a circle to represent each of the component sets.
  - Be very organized working first within parentheses or braces. One of the operations should be used for each step.
  - Complement is done first if 2 operations are in one set of parentheses.

Example of Picturing a Set

$[(A-C') \cup (B' \cap A)]'$
A = 1,2,3,4 and C′ =2,4,6,8
(A–C′) = 1,3

B′ = 3,4,7,8 and A = 1,2,3,4
(B′∩ A) = 3,4

$[(A-C') \cup (B' \cap A)]$ = 1,3,4

$[(A-C') \cup (B' \cap A)]'$ =2,5,6,7,8

Diagrams of Sets with Other Relationships

- Draw a diagram for the following sets M, N, P such that $M \cap P = \emptyset, P \not\subset N, P \cap N \neq \emptyset$.
- Shade $M \cup P - N \cap P'$
  - Circle M is inside of N.
  - Circles M and P do not overlap.
  - P is not inside of N but they overlap.

The Shaded Set