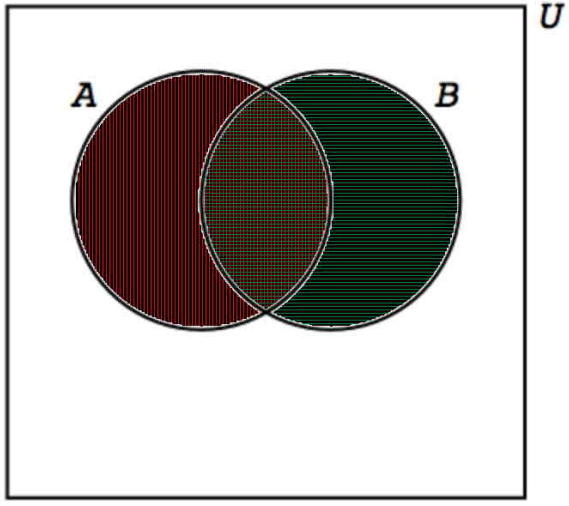
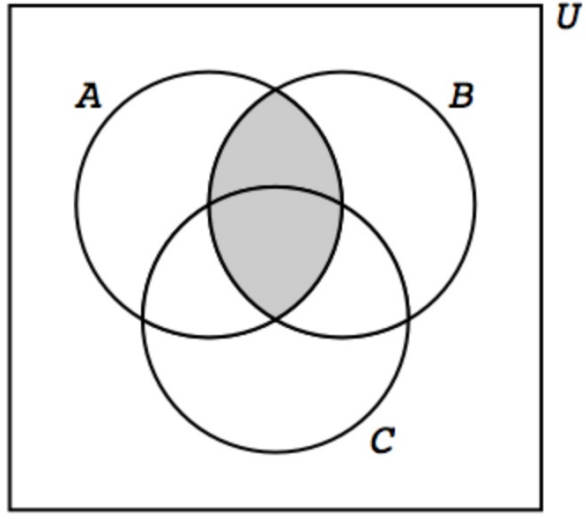
Venn Diagrams

We can visual subsets of a universal set, and how they interact/overlap, using *Venn diagrams*, as shown below.



$A \cap B$

$(A' \cup B')'$



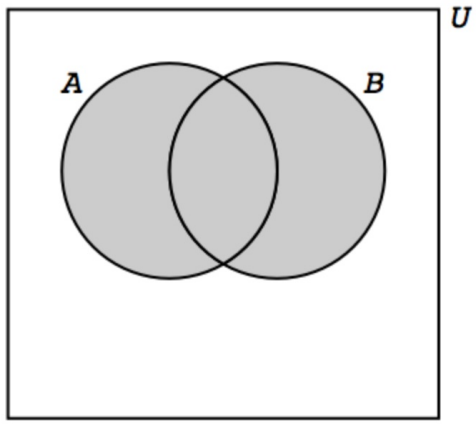
$A \cap B$

$(A' \cup B')'$

On the left, the brown shaded region is $A \cap B$. It is also $(A' \cup B')'$. On the right, the shaded area is $A \cap B$.

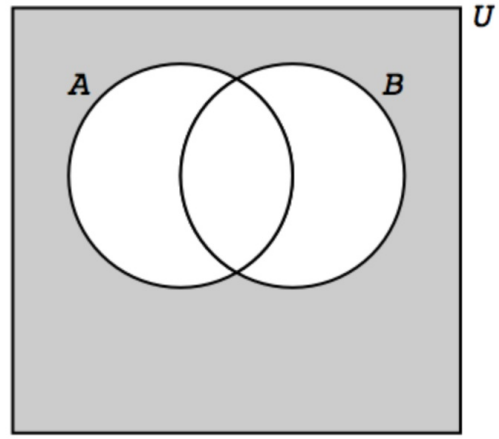
Venn Diagrams

Some more examples:



$A \cup B$

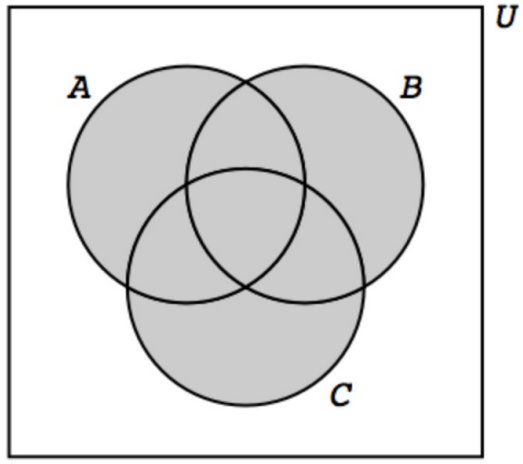
$(A' \cap B')'$



$A' \cap B'$

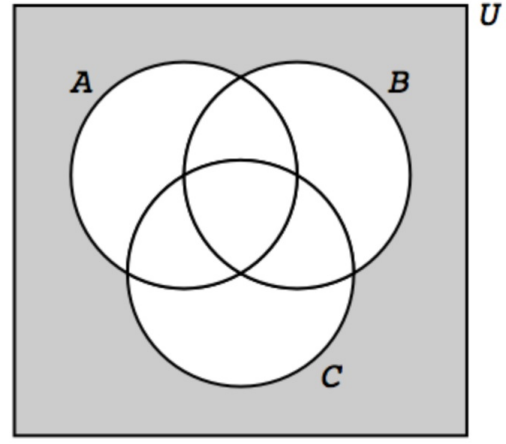
$(A \cup B)'$

Venn Diagrams



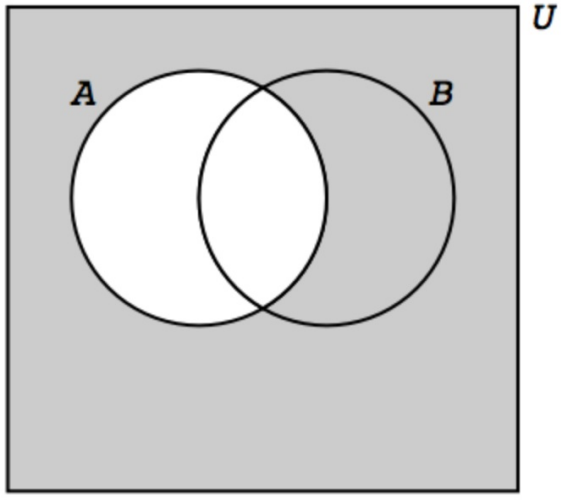
$A \cup B \cup C$

$(A' \cap B' \cap C')'$

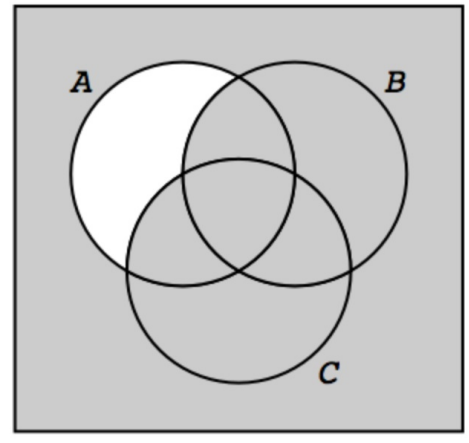


$A' \cap B' \cap C'$

$(A \cup B \cup C)'$



A'



$A' \cup B \cup C$

$(A \cap B' \cap C')'$

Compute the elements of various subsets

Example If $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8\}$ and $C = \{3, 4, 5, 6\}$ are subsets of the universal set $U = \{1, 2, 3, \ldots, 10\}$, list the elements of the set $A' \cup (B \cap C)$.

$A' = \{5, 6, 7, 8, 9, 10\}$, $B \cap C = \{4, 6\}$ so
$A' \cup (B \cap C) = \{4, 5, 6, 7, 8, 9, 10\}$.

Venn diagrams for presentations

Venn diagrams using two or three sets are often used in presentations.