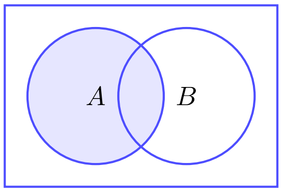
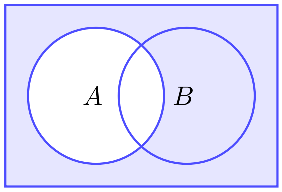
Sixteen things you can say about A and B

Each of the 16 sets below is indicated by a shaded region.



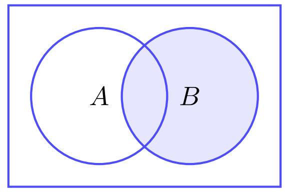
A

$\boldsymbol{A}$



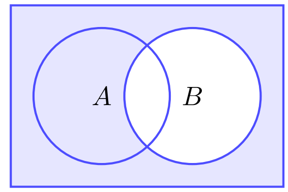
not A

$\boldsymbol{A^c}$



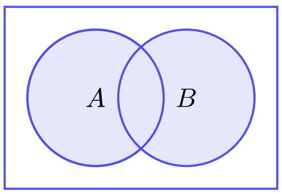
B

$\boldsymbol{B}$



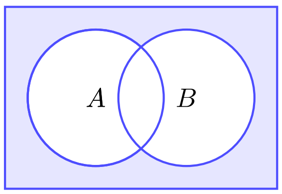
not B

$\boldsymbol{B^c}$



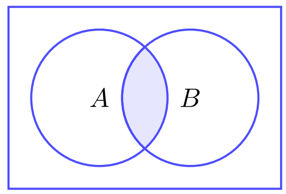
A or B

$\boldsymbol{A \cup B}$



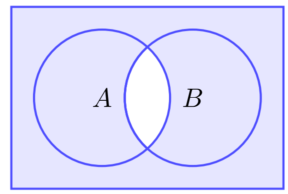
neither A nor B

$\boldsymbol{(A \cup B)^c}$



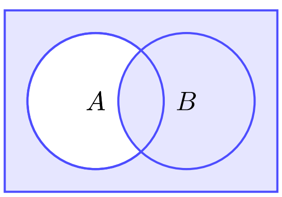
A and B

$\boldsymbol{A \cap B}$



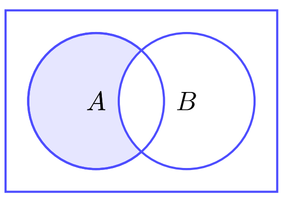
not both A and B

$\boldsymbol{(A \cap B)^c}$



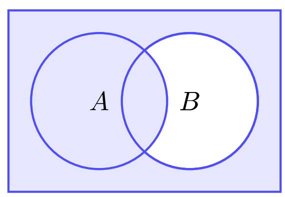
if A then B

$\boldsymbol{A^c \cup B}$



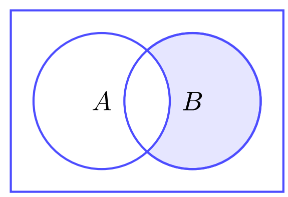
A and not B

$\boldsymbol{A \cap B^c}$



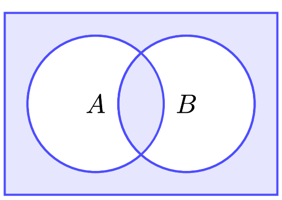
if B then A

$\boldsymbol{A \cup B^c}$



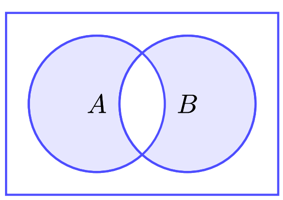
B and not A

$\boldsymbol{A^c \cap B}$



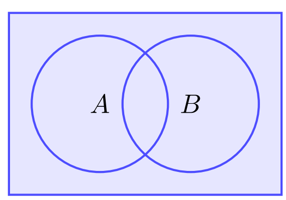
A if and only if B

$\boldsymbol{(A \cap B) \cup (A^c \cap B^c)}$



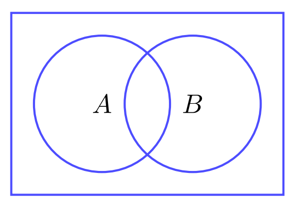
A or B but not both

$\boldsymbol{(A \cap B^c) \cup (A^c \cap B)}$



true

$\boldsymbol{A \cup A^c}$



false

$\boldsymbol{A \cap A^c}$

Complementary Laws:	$\boldsymbol{A \cup A^c = \emptyset^c}$	$\boldsymbol{A \cap A^c = \emptyset}$
Associative Laws:	$\boldsymbol{A \cup (B \cup C) = (A \cup B) \cup C}$	$\boldsymbol{A \cap (B \cap C) = (A \cap B) \cap C}$
Commutative Laws:	$\boldsymbol{A \cup B = B \cup A}$	$\boldsymbol{A \cap B = B \cap A}$
Distributive Laws:	$\boldsymbol{A \cup (B \cap C) = (A \cup B) \cap (A \cup C)}$	$\boldsymbol{A \cap (B \cup C) = (A \cap B) \cup (A \cap C)}$
De Morgan's Laws:	$\boldsymbol{(A \cup B)^c = A^c \cap B^c}$	$\boldsymbol{(A \cap B)^c = A^c \cup B^c}$