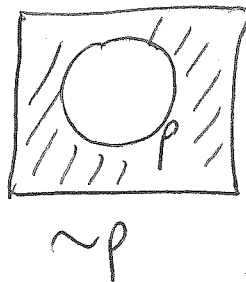
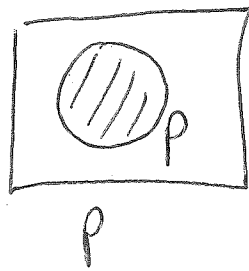
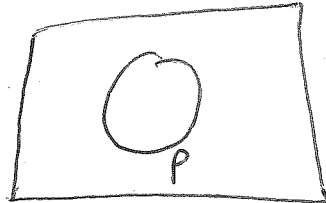


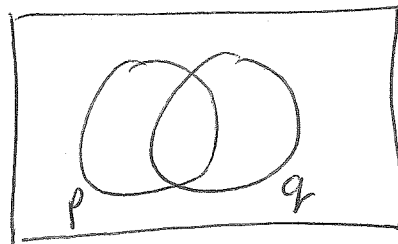
2.2 Venn Diagrams

A way to visualize truth values of logical propositions.

Venn diagram with 1 proposition:

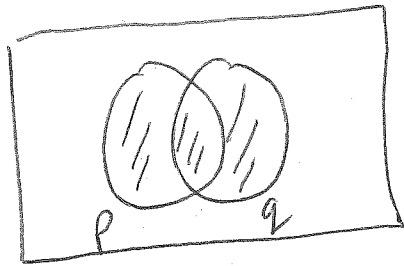


Venn diagram with 2 propositions:

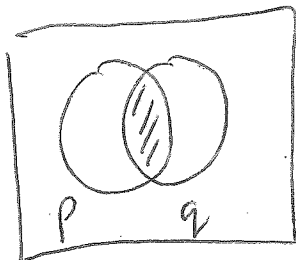


Ex: Draw the Venn diagram for

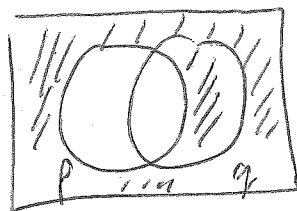
a) $p \vee q$



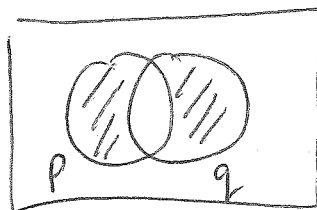
b) $p \wedge q$



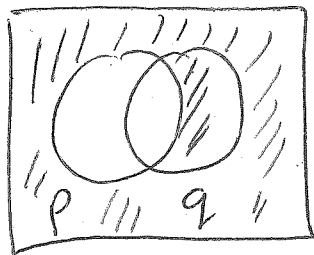
c) $\sim p$



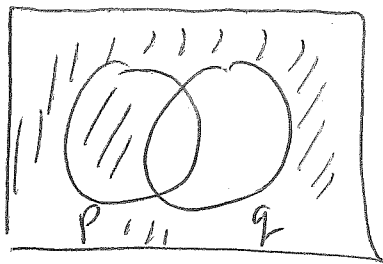
d) $p \oplus q$



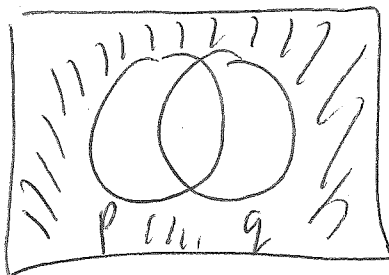
Ex: Draw the Venn diagram for $\sim p \wedge \sim q$



$\sim p$

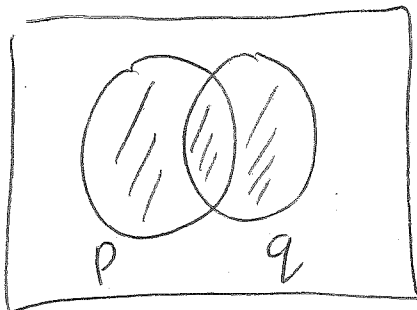


$\sim q$

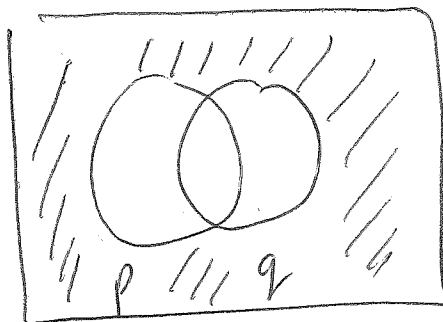


$\sim p \wedge \sim q$

Ex: Draw the Venn diagram for $\sim(p \vee q)$



$p \vee q$



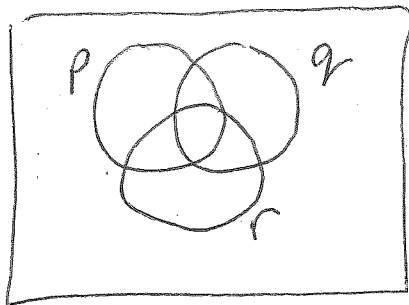
$\sim(p \vee q)$

Conclude: $\sim p \wedge \sim q$ is logically equivalent to
 $\sim(p \vee q)$

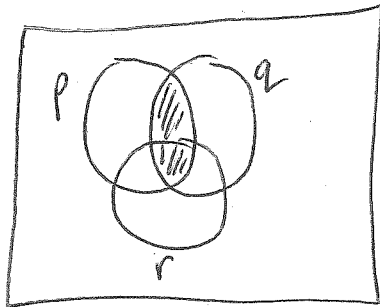
Can similarly conclude:

$\sim p \vee \sim q$ is logically equivalent to
 $\sim(p \wedge q)$

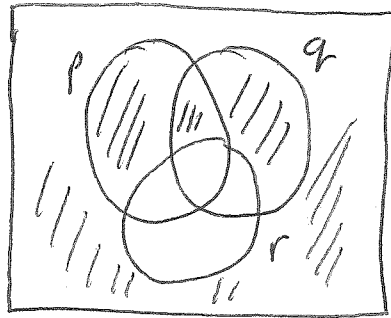
Venn diagram with 3 propositions:



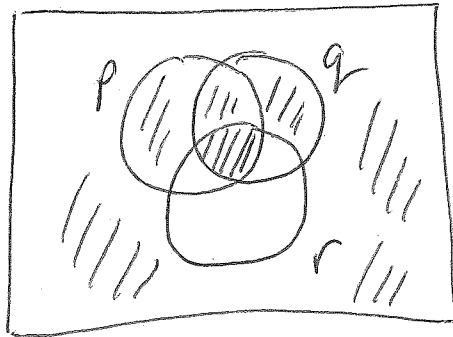
Ex: Draw the Venn diagram for $(p \wedge q) \vee \sim r$



$p \wedge q$

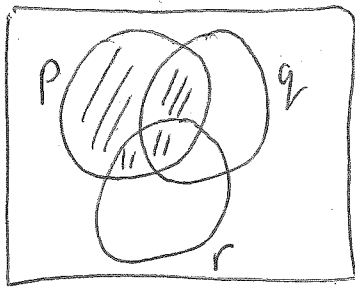


$\sim r$

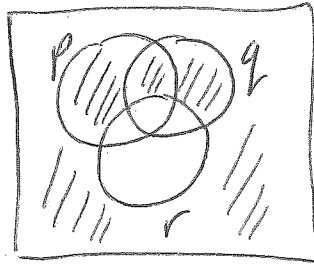


$(p \wedge q) \vee \sim r$

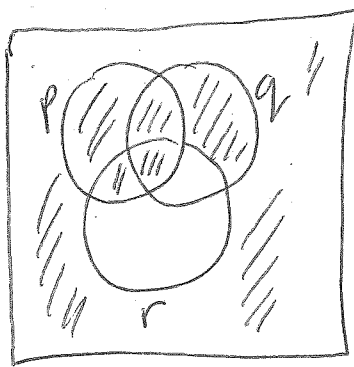
Ex: Draw the Venn diagram for $\sim(p \vee r) \vee \sim q$



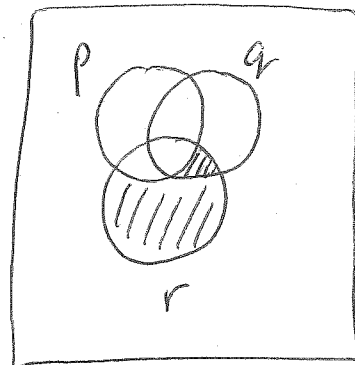
p



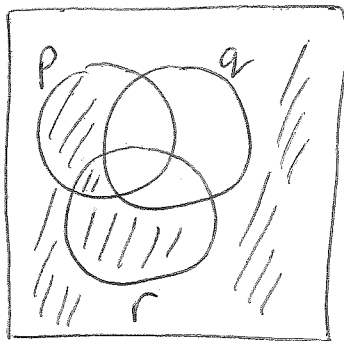
$\sim r$



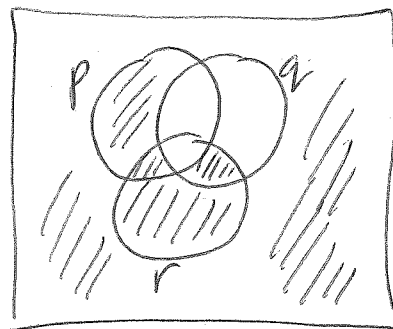
$p \vee r$



$\sim(p \vee r)$



$\sim q$



$\sim(p \vee r) \vee \sim q$