Statement: a sentence that is true or false

Today is Wednesday.  true

Today is Friday.  false, still a statement

He is hungry.  not a statement unless we know who "he" is

compound statement: built from smaller statements using conjunctions

Today is Wednesday and tomorrow is Thursday.  

Today is Thursday and tomorrow is Wednesday  

statement form:  \( p \land q \)
\[
\begin{array}{c|c|c}
\text{p} & \text{q} & \text{pq} \\
\hline
T & T & T \\
T & F & F \\
F & T & F \\
F & F & F \\
\end{array}
\]

**Conjunction of p,q**

\[
\begin{array}{c|c|c}
\text{p} & \text{q} & \text{p} \lor \text{q} \\
\hline
T & T & T \\
T & F & T \\
F & T & T \\
F & F & F \\
\end{array}
\]

**Disjunction of p,q**

Today is Wed or tomorrow is Thu.

The Yankees rule or the D纽约 are good.

I want to win the lottery or marry a billionaire.

You get credit for MA295 or MA395. exclusive or
not: John is not hungry

It is not the case that John hungry

\( p = \) John is hungry

\( \neg p \) or \( \neg \neg p \)

\[
\begin{array}{c|c|c}
    p & \neg p & \neg \neg p \\
    \hline
    T & F & T \\
    F & T & T \\
\end{array}
\]

\( \neg p \lor q \)

John is not hungry or John is sleeping

\( p = \) John is hungry

\( q = \) John is sleeping
\neg (p \lor q)

It is not the case that John is hungry or John is sleeping.
It is not the case that either John is hungry or sleeping.
John is neither hungry nor sleeping.

It is September but it is cold.
Suppose T then it must be that
1) It is Sept.
2) It is cold
not useful to us, so
\[ \Rightarrow \]
3) That's weird!
and = but
\[(p \lor q) \land \neg (p \land q) = F\]

\[F \quad p = \text{It is Oct}\]

\[F \quad q = \text{The leaves are falling.}\]

It is either Oct or the leaves are falling and also it is not the case that both it is Oct and the leaves are falling.

\[
\begin{array}{c|cc|cccc}
  p & q & (p \lor q) & (p \land q) & \neg (p \land q) & (p \lor q) \land \neg (p \land q) \\
  \hline
  T & T & T & T & F & F \\
  T & F & T & F & F & F \\
  F & T & T & F & F & F \\
  F & F & F & F & F & F \\
\end{array}
\]