**Review for Test**

**Conjunction:** "and" = \( p \land q \)

\[ \neg q \]

\[ q \]

**Eg:** Mars is a planet and I love broccoli.

**Negation:** Mars is not a planet or I don't love broccoli.

**Disjunction:** "or" = \( p \lor q \)

\[ \neg p \]

\[ q \]

**Eg:** Bob won the election or Today is Tuesday.

**Negation:** Bob lost the election and Today is not Tuesday.
Conditional: \[ \text{"if --- then"} \]
\[ p \rightarrow q. \]

Negation: \[ p \land \neg q. \]

Eg: if today is Tuesday, it is raining.

Negation: If today is \underline{Tu}
Negation: Today is \underline{Tuesday} and \underline{it} is not
raining.

"All" statement: All \( p \).
Neg: "Some": Some \( p' \).

Eg: All my exes live
Eg: All my exes live in Texas.
Neg: Some of my exes don't live in \underline{TX}.

"Some" statement: Some \( q \).
Neg: All \( q' \).
Eg: Some of the students cheated
Neg: All of the students did not cheat.
or: None of the students cheated.

Review on Truth Table

1 letter = $2^1$ rows.
2 letters = $2^2$ or 4 rows.
3 letters = $2^3$ or 8 rows.

Eg: $(P \lor P') \rightarrow q \cdot = 4$ rows.

<table>
<thead>
<tr>
<th>P</th>
<th>$\neg$</th>
<th>$P'$</th>
<th>$P \lor P'$</th>
<th>$(P \lor P') \rightarrow q\cdot$</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>T</td>
<td>F</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>F</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
</tbody>
</table>


Converse:

If \( p \rightarrow q \) is my conditional statement, then \( q \rightarrow p \) is said to be its converse.

\[ \text{Ex: (True)} \]
If John lives in Texas, he lives north of the equator.

\[ \text{Not True} \]
Converse: If John lives north of the equator, then he lives in Texas.

An example of a statement whose converse is true.

\[ \text{Ex:} \]
If temperature is below 32
If I'm older than my sister, then my sister is younger than me.

Converse: If my sister is younger than me, then I'm older than my sister.
Equivalence:

When
\[ p \rightarrow q \] is true

And
\[ q \rightarrow p \] is true,

we have an equivalence,

\[ p \leftrightarrow q \]

"p if and only if q"

Ex:
1. \( x \) is an even # if and only if it is divisible by 2.

2. \( \triangle \) is equilateral if and only if it is equiangular.

3. If \( \triangle \) is equilateral, if and only if all its angles are acute (less than 90°). Note: Its converse is not necessarily true. 

\[ \rightarrow \text{Not a good equivalence.} \]