Negating Logic statements

Conjunction Statements:
I do my homework and I pass my math class.

\[ p \land q \]

To negate this statement apply De Morgan’s Law first form:

\[ \neg(p \land q) \equiv \neg p \lor \neg q \]

Which reads: I do not do my homework or I do not pass my math class.

\[ \neg p \lor \neg q \]

Disjunction Statements
I do my homework or I do not pass my math class.

\[ p \lor q \]

To negate this statement apply De Morgan’s Law second form:

\[ \neg(p \lor q) \equiv \neg p \land \neg q \]

Which reads: I do not do my homework and I do pass my math class.

\[ \neg p \land \neg q \]

Conditional Statements:
If I do my homework then I pass my math class.

\[ p \rightarrow q \]

To negate this statement use this rule:

\[ \neg(p \rightarrow q) \equiv p \land \neg q \]

You do your homework and you still do not pass your math class.

\[ p \land \neg q \]
Qualifying Statements:

Statements with All:

All dogs have fleas

Negating this statement means: not all dogs have fleas which means

Some dogs do not have fleas

Statements with some:

Some dogs have fleas

Negating this statement means: None have fleas, which means

All dogs do not have fleas