ID:_____   Name:_____

1. Logical connectives (or operators) of two propositions p and q.

Proposition Name	Notation	Read As
Negation of p	$\neg p$	not p
Conjunction of p and q	$p \wedge q$	p and q
Disjunction of p and q	$p \vee q$	p or q
Biconditional of p and q	$p \leftrightarrow q$	p if and only if q

2. Construct the truth table of the **Converse**, **Inverse,** and **Contrapositive** of a conditional statement $\boldsymbol{p \to q}$:

p	q	$p \to q$	$\neg p$	$\neg q$	Converse $q \to p$	Inverse $\neg p \to \neg q$	Contrapositive $\neg q \to \neg p$
T	T	T	F	F	T	T	T
T	F	F	F	T	T	T	F
F	T	T	T	F	F	F	T
F	F	T	T	T	T	T	T

3. Let p and q be the propositions

p: It is below freezing. q: It is snowing.

Write these propositions using p and q and logical connectives.

(a) It is below freezing <u>and</u> sowing. $p \wedge q$

(b) It is ~~now~~ ^{not} below freezing, <u>and</u> it is <u>not</u> snowing. $\neg p \wedge \neg q$

(c) That it is below freezing is <u>necessary and sufficient</u> for it to be snowing. $p \leftrightarrow q$
if and only if