Math 151 ~~Quiz 7~~ Group Worksheet Name:______________________________

Theorems and Definitions from early Ch. 3 Color Code: ______________________________

Unjustified answers will be treated with skepticism. Remember, this class is more about the language than the mathematical answer. Your answers should reflect that emphasis.

1. The following truth table is set up to prove that two distinct sentences (shown as blank headings in the table) are both logically equivalent to $H \implies C$. Fill in the blank with the missing sentences.

   (*Hint: One of the missing headings uses the connective "or," and the other is called the "contrapositive."*)

H	C	$H \implies C$	not H	__________	not C	__________
T	T	T	F	T	F	T
T	F	F	F	F	T	F
F	T	T	T	T	F	T
F	F	T	T	T	T	T

2. Compare and contrast the contrapositive of $H \implies C$ with the converse of $H \implies C$. Which one(s) is/are logically equivalent to the statement $H \implies C$?

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3. Suppose you are given the fact: $A \implies (B \text{ and } C)$.

   (a) Can you conclude that either B is true or C is true? Can you conclude that both B and C are true? Explain.

   (b) The theorem on two conclusions gives us a way to break apart the given fact ($A \implies (B \text{ and } C)$) into two separate implications. How?

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4. If $(A \text{ or } B) \implies C$, what can you say about A and B separately? (Be precise in your language.)

5. Give a verbal example to illustrate how the *converse* of $A \implies B$ is related to $A \implies B$ itself.

6. Re-express the sentence "$A \iff B$" as a compound statement, as the theorem on "if and only if" allows.