

Math 106

Homework, sections 3.1-3.3

Name _____

Due at beginning of class Thursday, April 2

1. Write a statement that represents the **negation** of each of the statements below. (The negation of a quantified statement should begin with "all," "some," or "no;" and none of the negations should begin with "It is not true that....")

a) Frank is not a fan of "ER."

b) No lunch is free.

c) Some elephants are pink.

d) All colas contain caffeine.

e) At least one banana is not ripe.

2. Write each of the statements below in symbolic form. Assign letters to simple statements that are not negated.

a) I do not sleep soundly if I drink coffee or eat chocolate.

b) All people born in the United States are American citizens.

c) Your check will not be accepted if you do not have a drivers' license and a credit card.

3. Let p and q represent the following simple statements:

p : *I am innocent.*

q : *I have an alibi.*

a) Using the simple statements above, express each of the following in words:

i) $p \wedge q$

ii) $\sim q \rightarrow \sim p$

iii) $q \vee \sim p$

b) Using the same simple statements from question 3 above, write each of the following statements in symbolic form.

i) My having an alibi is necessary for being found innocent.

ii) I will be found innocent if and only if I have an alibi.

iii) I have an alibi but I am not found innocent.

iv) I will be found innocent if I have an alibi.

c) Construct a truth table for the statement "I have an alibi but I am not found innocent," (biii above) and indicate all conditions under which the statement is true.

4. Construct a truth table for the following symbolic expressions:

a) $\sim p \vee q$

b) $p \vee \sim (p \wedge q)$

c) $(p \vee q) \wedge (\sim p \vee \sim q)$