MAT 243 WRITTEN HOMEWORK 1

NAME: _____

(1) Fill in the blank in the statements below:

(a) Two propositions are logically equivalent if and only if _____

(b) A tautology is a _____

(c) The negation of "if p then q" is _____

(d) "r is a sufficient condition for s" means if _____ then _____

(e) "a is a necessary condition for b" means if _____ then _____

(2) Given the conditional: I go to the beach or I go out dancing, if I am done with my work.

(a) State the converse of this statement:

(b) State the contrapositive of this statement:

(c) State the negation of this statement:

(3) Write the following statements in symbolic form. Identify the propositional functions (if needed), universe of discourse you are using:

(a) Anne likes Dave but Dave likes someone else.

(b) There is an integer that is smaller than or equal to all integers.

(4) Write the following statements in *If , then* form:

(a) You finish your salad or you cannot have icecream.

(b) It is necessary that 1/x is irrational for x to be irrational.

(c) I get an A in my English class only if I get an A on the final.

(5) Express the negation of the following statement. All negations should be simplified as much as possible. Show and explain your steps.

$\forall x \, \exists y \, (y > 0 \rightarrow (-2 < x \leq 6))$