**Applications of College Algebra**

**Chapter 3 – Logic**

**Unit 3.6 – Negations of Conditional Statements and De Morgan’s Law**

**The Negation of the Conditional Statement p → q**

The negation of p → q is p ˄ ~q.

This can be expressed as ~(p → q) $≡$ p ˄ ~q

**Example 1 Writing the Negation of a Conditional Statement**

Write the negation of

 If too much homework is given, a class should not be taken.

p: Too much homework is given.

q: A class should not be taken.

p → q is p ˄ ~q

Too much homework is given and the class should be taken.

**De Morgan’s Law**

1. ~(p ˄ q) $≡$ ~p ˅ ~q
2. ~(p ˅ q) $≡$ ~p ˄ ~q

**Example 2 Using a De Morgan’s Law**

Write a statement that is equivalent to

 It is not true that Atlanta and California are cities.

~(p ˄ q) $≡$ ~p ˅ ~q

Atlanta is not a city or California is not a city.

**De Morgan’s Law and Negations**

1. ~(p ˄ q) $≡$ ~p ˅ ~q

The negation of p ˄ q is ~p ˅ ~q. To negate a conjunction, negate each component statement and change *and* to *or*.

1. ~(p ˅ q) $≡$ ~p ˄ ~q

The negation of p ˅ q is ~p ˄ ~q. To negate a disjunction, negate each component statement and change *or* to *and*.

**Homework p162 # 11-15, 39-45 odd**