## **Boolean Algebra Theorems**

Theorem 1 
$$X + XY = X$$

Theorem 2 
$$X + X'Y = X + Y$$

Theorem 3 
$$XY + X'Z + YZ = XY + X'Z$$

Theorem 4 
$$X(X+Y)=X$$

Theorem 5 
$$X(X'+Y) = XY$$

**Theorem 6** 
$$(X + Y)(X + Y') = X$$

**Theorem 7** 
$$(X + Y)(X' + Z) = XZ + X'Y$$

**Theorem 8** 
$$(X + Y)(X' + Z)(Y + Z) = (X + Y)(X' + Z)$$

## DeMorgan's Theorems

- 1. Complement entire Expression
- 2. Complement each Term
- 3. Change operation from AND to OR or OR to AND

**Theorem 9** 
$$(XYZ)' = X' + Y' + Z'$$

**Theorem 10** 
$$(X + Y + Z)' = X'Y'Z'$$