

### Section 1.3: Truth Tables (Conjunctions and Disjunctions)

What is a truth table?

#### **The Conjunction (and statement) Truth Table**

Given:  $P =$  Today is Monday.       $Q =$  It is cloudy outside.

Case 1: Today is Monday and it is cloudy outside.

Case 2: Today is Monday and it is snowing.

Case 3: Today is Sunday and it is cloudy outside.

Case 4: Today is Sunday and it is raining.

General Rule for the Conjunction Truth Table:

### The Disjunction (or statement) Truth Table

Given:  $P$  = You are a student at Radford University.       $Q$  = It is January.

Case 1: You are a student at Radford University or it is January.

Case 2: You are a student at Radford University or it is July.

Case 3: You are a student at Virginia Tech or it is January.

Case 4: You are a student at Virginia Tech or it is July.

General Rule for the Disjunction Truth Table:

Create a Truth Table for each statement

1.  $P \vee Q$

2.  $P \wedge Q$

3.  $\sim P \vee \sim Q$

4.  $\sim Q \wedge P$

5.  $\sim(P \wedge \sim Q)$

6.  $(P \vee \sim Q) \wedge (\sim P \wedge Q)$

Vocabulary of Truth Table results:

Tautology

Contradiction

Logically Equivalent