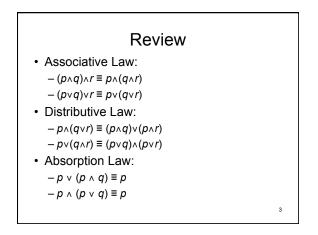
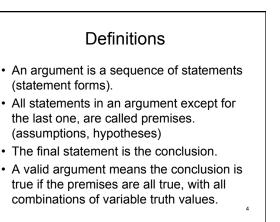
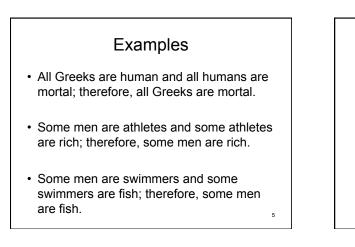
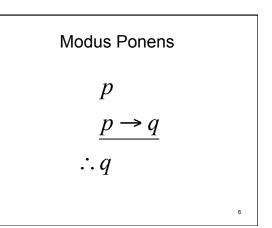
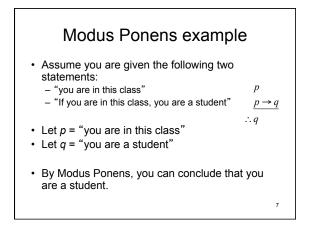
Review p→q ≡ • $(p \lor q) \land \sim (p \land q)$ •~pvq • $\sim (p \land q) \equiv$ · Contrapositive: • ~p v ~q Valid and Invalid Arguments • ~q→~p • $\sim (p \lor q) \equiv$ Inverse: ~p ∧ ~q CS 231 ~p→~q • p is sufficient for q Dianna Xu Converse: *p*→*q* • *q*→*p* p is necessary for q • *p*⊕*q* ≡ ~p→~q 2

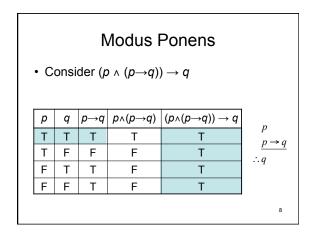


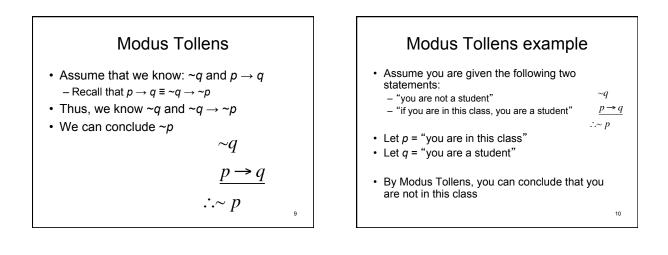


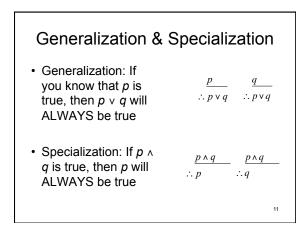


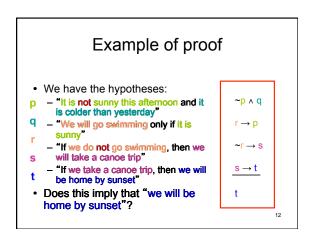






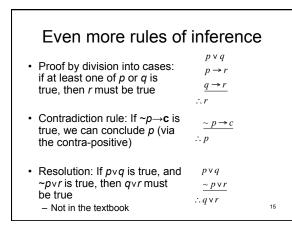


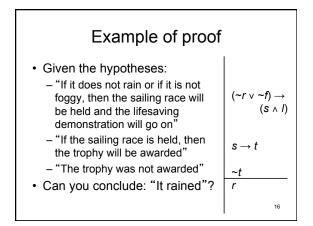




Example of proof					
1. ~p∧q	1 st hypothesis				
2. ~p	Specialization using step 1				
3. $r \rightarrow p$	2 nd hypothesis				
4. ~r	Modus tollens using steps 2 & 3				
5. ~r → s	3 rd hypothesis				
6. s	Modus ponens using steps 4 & 5				
7. $s \rightarrow t$	4 th hypothesis				
8. t	Modus ponens using steps 6 & 7				
	р	$\sim q$			
$\underline{p \land q}$	$p \rightarrow q$	$\underline{p \rightarrow q}$			
$\therefore p$	$\therefore q$	$\therefore \sim p$	13		

More rules of inference				
 Conjunction: if p and q are true separately, then p∧q is true 	$\frac{p}{q}$ $\therefore p \land q$			
 Elimination: If p∨q is true, and p is false, then q must be true 	$ \begin{array}{ccc} p \lor q & p \lor q \\ \stackrel{\sim}{\sim} p & \stackrel{\sim}{\sim} q \\ \therefore q & \therefore p \end{array} $			
• Transitivity: If $p \rightarrow q$ is true, and $q \rightarrow r$ is true, then $p \rightarrow r$ must be true	$p \to q$ $\frac{q \to r}{\therefore p \to r}$ 14			





	Example of proof						
1.	~t	3 rd hypothesis					
2.	$s \rightarrow t$	2 nd hypothesis					
3.	~s	Modus tollens using steps 1 & 2					
4.	(~ <i>r</i> ∨~ <i>f</i>)→(S∧ <i>l</i>)	1 st hypothesis					
5.	~(s∧l)→~ (~r∨~f)	Contrapositive of step 4					
6.	$(\sim s \lor \sim l) \rightarrow (r \land f)$	DeMorgan's law and double negation law					
7.	~sv~l	Generalization using step 3					
8.	r∧f	Modus ponens using steps 6 & 7					
9.	r	Specialization using step 8					
	р			$\sim q$			
	$\underline{p \to q}$	<u>p</u>	$p \land q$	$\underline{p \rightarrow q}$			
	$\therefore q$	$\therefore p \lor q$	$\therefore p$	$\therefore \sim p^{-17}$			

