

Name _____ Quiz 1

1) Assume P and Q are true, while R is false. Find the truth value of the statement forms below.

a) $P \vee R$

This means " P or R is true" which is true because P is true.

b) $R \Rightarrow Q$

This means "If R , then Q " which is true because R is false and Q is true.

c) $\sim Q$

This means "Not Q " which is false because Q is true.

2) Let P be "It will rain today" and Q be "I will use an umbrella". Write down the statement form that represents the statement "If it rains today, then I will use an umbrella".

This is the statement form $P \Rightarrow Q$.

3) Fill in the missing pieces of the proof below.

Claim: $((P \Rightarrow E) \wedge (P \vee C) \wedge (I \Rightarrow \sim C) \wedge I) \Rightarrow E$

Statements	Reasoning	
$I \Rightarrow \sim C$	<u>Premise</u> _____	(1)
I	<u>Premise</u> _____	(2)
<u>$\sim C$</u> _____	Modus Ponens applied to lines 1 and 2.	(3)
$P \vee C$	<u>Premise</u> _____	(4)
P	Disjunctive Syllogism applied to lines 3 and 4.	(5)
$P \Rightarrow E$	<u>Premise</u> _____	(6)
E	<u>Modus Ponens applied to lines 5 and 6</u> _____	(7)

Dictionary of previous theorems used:

Modus Ponens: $(P \wedge (P \Rightarrow Q)) \Rightarrow Q$

Disjunctive Syllogism: $((P \vee Q) \wedge \sim Q) \Rightarrow P$

4) Construct a proof of the claim below.

Claim: $(P \wedge (S \vee R) \wedge (P \Rightarrow \sim R)) \Rightarrow S$

Statements	Reasoning	
P	Premise	(1)
$P \Rightarrow \sim R$	Premise	(2)
$\sim R$	Modus Ponens applied to lines 1 and 2.	(3)
$S \vee R$	Premise	(4)
S	Disjunctive Syllogism applied to lines 3 and 4	(5)

Hint: You may not need every line, but you will need the theorems below:

Modus Ponens: $(P \wedge (P \Rightarrow Q)) \Rightarrow Q$

Disjunctive Syllogism: $((P \vee Q) \wedge \sim Q) \Rightarrow P$