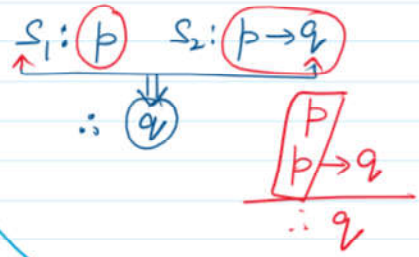
L-8 Inference

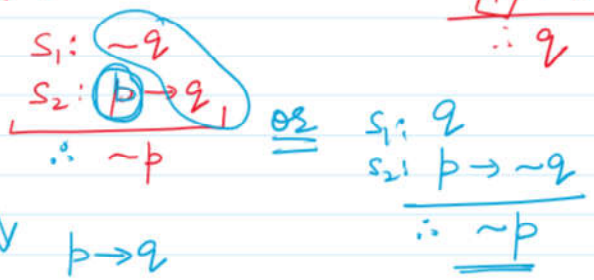
Tuesday, February 8, 2022 9:56 AM

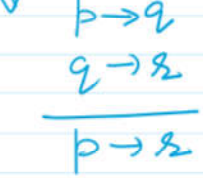
Rules of Inference :-

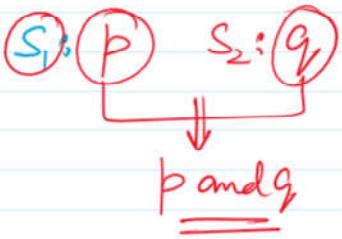
TABLE 1 Rules of Inference.

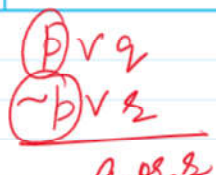
Rule of Inference	Tautology (Valid Argument)	Name
p $p \to q$ $\therefore q$	$(p \wedge (p \to q)) \to q$	Modus ponens (Law of Detachment)
$\neg q$ $p \to q$ $\therefore \neg p$	$(\neg q \wedge (p \to q)) \to \neg p$	Modus tollens (Law of Denying)
$p \to q$ $q \to r$ $\therefore p \to r$	$((p \to q) \wedge (q \to r)) \to (p \to r)$	Hypothetical syllogism
$p \vee q$ $\neg p$ $\therefore q$	$((p \vee q) \wedge \neg p) \to q$	Disjunctive syllogism
p $\therefore p \vee q$	$p \to (p \vee q)$	Addition
$p \wedge q$ $\therefore p$	$(p \wedge q) \to p$	Simplification
p q $\therefore p \wedge q$	$((p) \wedge (q)) \to (p \wedge q)$	Conjunction
$p \vee q$ $\neg p \vee r$ $\therefore q \vee r$	$((p \vee q) \wedge (\neg p \vee r)) \to (q \vee r)$	Resolution

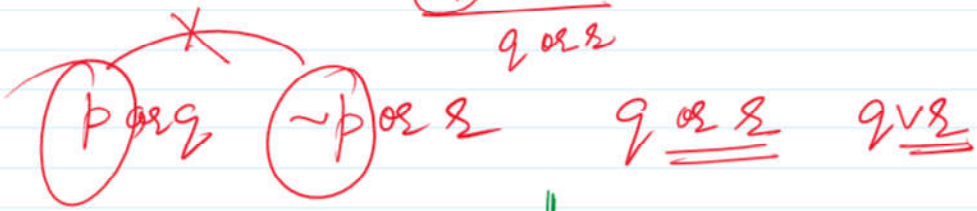


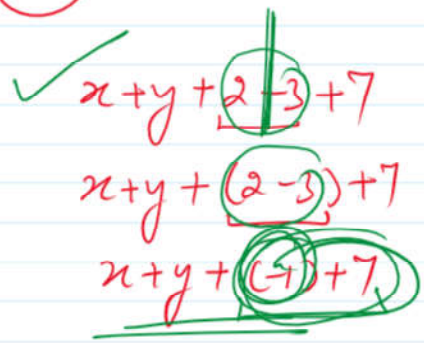












State which rule of inference is the basis of the following argument: "It is below freezing now. Therefore, it is either below freezing or raining now."

One statement premise

Conclusion (OR) → $p \vee q$

p

$S_1: p$
$C: p \vee q$

$\frac{p}{p \vee q}$ → Addition

State which rule of inference is the basis of the following argument: "It is below freezing and raining now. Therefore, it is below freezing now."

If it rains today, then we will not have a barbecue today. If we do not have a barbecue today, then we will have a barbecue tomorrow. Therefore, if it rains today, then we will have a barbecue tomorrow.

(A) Hypothetical
(B) Modus Tollens
(C) Disjunctive
(D) Resolution

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If p then q $p \to q$

If q then r $q \to r$

$p \to q$ and $q \to r$

$p \to r$

Let p: You read the newspaper every day. q: You will be informed. Which of the following is logical expression for "If you read the newspaper every day, you will be informed, and conversely"?

(A) $q \to p$ (B) $p \wedge q$ (C) $p \to q$ (D) $p \leftrightarrow q$

If p then q and Conversely

$p \to q$ & $q \to p$

$p \leftrightarrow q$