

$$P \rightarrow Q \vee R$$

$$\begin{array}{l}
 R \\
 R \vee Q \\
 Q \vee R \\
 P \leftrightarrow Q \vee R \\
 (P \rightarrow Q \vee R) * (Q \vee R \rightarrow P) \\
 (Q \vee R \rightarrow P) \text{ (simp)} \\
 P \text{ (MP)} \\
 QED
 \end{array}$$

addition
commutation

$$I \rightarrow (C \vee K)$$

$$\begin{array}{l}
 I \\
 \sim C \\
 K \rightarrow (\sim S * E) \\
 M \rightarrow S \\
 C \vee K \text{ [MP1,2]}
 \end{array}$$

$$\begin{array}{l}
 \sim A \rightarrow B \quad \therefore A \vee B \\
 A \vee B \quad \text{[Mat. Imp]} \\
 QED
 \end{array}$$

$$\begin{array}{l}
 \sim C \\
 K \quad [D \cdot E] \\
 \sim S * E \text{ [MP]} \\
 \sim S \quad [C \cdot E] \\
 \sim M
 \end{array}$$

$$\begin{array}{l}
 (C \rightarrow D) \vee \sim (X * Y) \\
 \swarrow \searrow \\
 \sim (X * Y) \vee (C \rightarrow D) \text{ Comm} \\
 (\sim X * \sim Y) \vee (C \rightarrow D) \text{ DeMog}
 \end{array}$$

$$\begin{array}{l}
 (J * K) \rightarrow (D \rightarrow I) \\
 \text{(Exportation)} \quad J \rightarrow (K \rightarrow (D \rightarrow I)) \\
 QED
 \end{array}$$

$G \rightarrow H$
 $I \rightarrow D$
 $G \vee I \therefore NVD$

All proofs are 2 lines long!!

$G \rightarrow H * I \rightarrow D$ (Conjoin)
 $NVD [CD]$

$$110 \rightarrow \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

$$110 \rightarrow \begin{matrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{matrix}$$

$$(X * Y) \rightarrow Z$$

$$\sim Z$$

$$Y$$

$$/ T \rightarrow P$$

$\sim(X * Y)$	MT
$\sim X \vee \sim Y$	DM
$\sim \sim Y$	DN
$\sim X$	DE
$\sim(T \vee P)$	MT
$\sim T * \sim P$	DM
$\sim T$	Simp
$\sim T \vee P$	Add.
$T \rightarrow P$	MI

$A \rightarrow \sim B$
 $C \rightarrow B$ $A \rightarrow \sim C$
 $\sim B \rightarrow \sim C$ [transposition]
 $A \rightarrow \sim C$ [HS 1, 3]

conclusion follow premises! \Rightarrow Logical

$\left\{ \begin{array}{l} \text{Reason: arrive @ conclusion given premise} \\ \text{Logic: Relationship b/w conc. \& premise} \end{array} \right.$

\rightarrow Can you arrive? Logic
 \rightarrow if premise is true, conclusion is true
 $\left\{ \begin{array}{l} \text{logic} \rightarrow \text{test if conclusion was arrived} \\ \text{Reasoning} \rightarrow \text{arrive @ conclusion correctly} \end{array} \right.$
arriving \rightarrow reasoning

Building of reasoning \rightarrow testing with logic
Argumentation

Tests if
good or bad
argument

Proposition $\left\{ \begin{array}{l} \text{Claim about something} \\ \text{Truth values} \\ \text{Affirmation possible} \end{array} \right.$

Proposition \neq sentence

\rightarrow Logic doesn't deal
with this
but with its assertion

Argument \rightarrow infer / deduce / arrive

Can be a rhetorical
qns

Deductive

Conclusion shall be true

Inductive

premise

significant support
Conclusion

Stats

post-exp. generalization

evidence of authority

Causal relationships

→ Cum hoc ergo propter hoc

Conclusion is incontrovertibly
(undeniably)

true because

premises

are true

Conclusions strong suggestion

★ Some amount of probability
involved even in
deductive reasoning

★

Laws of thought:

1. Law of Identity = Everything is identical to itself:

* A duck is a duck

* A non duck is a non duck

2. Law of non contradiction $P \& \sim P$ is wrong

3. Law of excluded middle $P \vee \sim P$ always

George Boole's addition

Commutativity

index law $A \& A$ is having same truth as 'A'
(used for contradiction)

logic doesn't deal with perspectives

Laws of thought are self evident

Laws of nature e.g. physics
require proofs

→ LEM doesn't work in the real world } but all this
because of perspectives } isn't a part of
logic

Recognize Argument

→ Arguments contain statements
Arguments aren't statements
They can be sentences
() can have more statements.

* Because women have a right to ^{their} body

* abortion is a right to their body

* rights are legal

∴ Abortion should be made legal

*

Words to indicate premise:

Since / For / Because / Given that

For I am the son of a king, you should call me a prince.

Words to indicate conclusion:

Therefore / Thus / Consequently / Hence / So / Consequently