



The Theory of Inference:

Argument:

An argument & a sequence of Statements. All statements except the tenal one are called premises (as assumption or hypothesis). The fixed statement is called conclusion.

ie, Lot P, Pa, ..., Pn be a soquence of Statements that steld conclusion a. It 98 denoted by $(P_1 \land P_2 \land \dots, P_n) \rightarrow Q$ is a tautology.

Valld Argument:

An argument is called valid if the conclusion is true when all premises one true.

Invaled Argument: An argument is called anvalled of it is not valed argument.

Rules of Inference:

Rule P: A piemise may be introduced at any point in the devilvation

Rule T: A formula Smay be antroduced at any point in a derevation of S 98 tautologically empted by any one as more of the procedling formula's

Rule CP: If Swe can dealer & brom R and a set of Premases, then we can desave R-> & from the Set of premases alone.

- El spons that RVS follows i). Essect Proof (a) Proof by contradiction
- iii) conditional proof
- iv) In consystem proof





when a conclusion is desired from a set Direct Proof: of premises by using accepted onless of reasoning then such a process of developt con 95 called direct people of good swife tog my room would give me placen

Imprication Rules: 10 mg more would's give me

J. Modus Phones:

- - 1 didn'+ 301 a good 3000 P, P→a →a

2. modus Tollens:

P+Q, 7A => 7P

3]. D9. Squactive Syllogism: TP, PVa → a

4]. Hypothetical Syllogism: P>a, a>R > P>0 (a) chain Rule

5. Sampfification Rule: P. a → PAQ

PAR > P. R.

a. Addation Rule:

B Q = PVQ

J. Equivalence Rule:

I Show that R is valled from the premises $P \rightarrow Q$, $Q \rightarrow R$ and P.

27. Show that RVS follows logically from the premises CVD, (CVD) > 74, TH -> (AMTB), and (AMTB) -> RVS





Book and the second		
Step	Plemises Rule	2 1/8/2/11
1.	CVD	
ℚ.	(CVD) -> TH	
71,29 3.	7H	
4.	TH > (ANTB) T	
. 6	ANTB P	
§3, 43 6.	ANTB -> PVS	
	RVS	
75,637.	18	20
of Show that	RA(PVQ) gg a value on the premases PVQ	a→R,
P-> M and		
Step	Premises Rale	
1.	TO	Tocking
2.	T	a u l-7
31,27 3.	Maria di Anglanda P	
₹1,23 3. 4.	Pra	
	a much that are Pol-	
₹3,4°3 6.	Q>K	
S- C7 7.	R	ed arma e
25,63 1.	RA(PVQ)	Anti-
{4,73 8.	C > B D-	> (AVC), D
4. Show that	$A \rightarrow B$, $C \rightarrow B$,	
18 B.	q	8 (8)
p o	349	
Deport T		# (+ 6)
	۵۳ م	
	Drain	1 (3.8)





Rule
Step Premases p
1. $D \rightarrow (AVC)$
2. D
\$123 3 AVC
$ \begin{cases} 33 \\ 4 \end{cases} $ $ 7A \rightarrow C $ $ 5. $ $ A \rightarrow B $ $ 7A \rightarrow B $ $ 7A \rightarrow B $ $ 7B \rightarrow A $ $ TB \rightarrow A $
S. $\mathbb{Z} \to \mathbb{B}$ $\mathbb{Z} \to \mathbb{B}$ $\mathbb{Z} \to \mathbb{B} \to \mathbb{B} \to \mathbb{B}$
₹4,53 6. TA → B
769 7. $7B \rightarrow A$ $P \rightarrow P \rightarrow R$
P P P P P P P P P P
T
0. 00 plu 7p from 21 PS 2, 76.
1 Prop
Inderect Proof: TO, P-12, PVP = R
pan plemestra
and clisthe conclusion their o
we get 7c ∧ (H ₁ ∧ H ₂ ∧∧Hm) ⇒F,
where f is the contradiction.
J. Prove by Product method TQ, P>Q, PVR=>R
Rule Rule
TR Nogation of conclusion
a. PVR
{1,23 3. P T, 7P, PVQ→Q
4. P→Q P
[3,4] 5. Q T, P, P→Q → Q
6. 7Q P
(5,6) 7. QATQ T, P,Q → PAQ
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d Otom 7	that TPATQ >	- T(PAR) by
9 pdflec	+ peoof.	
		Rule
Step	Piempces	
1.	PAR	negation of conclusion
₹13 æ.	P	T PAQ → P
3.	TPATR	P
f33 4.	TP	T TPMQ STP
र्व,43 र्व.	PATP	T P, Q ⇒ PAQ
753 6.	F	T
5 01 2 46	at $R \rightarrow 78$, RVS	, 8 - TQ, P - Q = TP
3. Show 10	resect method.	
	Piemgses	Rule
Step	P	regetion of conclusion
۱. ع	P>Q	P
	€.	T P, P+A = Q
وَارِيْكُوعُ . 4.	R->7Q	P
	TR	T P>Q, TQ => T
[3,4] 5. 6.	RVS	partial a net
2 -	S	T TR, RVS > S
[5,6] T. 8.	8-78	P
-20	16	TP, P->日今日
77,839 [3,93 10.	anta	T P. R > PAR
11.	F	T PATP (F
11.		
	7 Ta, 1	707 11 (CaU)
Has	2) (PAR)A(P78 9 78 R+S), (2+7) 1(S+U), P+B) +TP
	Y (TAU),	P-) P) =) 11





The state of the s	Chicago and the Control of the Contr		
Condition	of Root:		
J. Show that	$R \rightarrow S$ can be $P \rightarrow (Q \rightarrow S)$, T	derved RVP and	from the
8et 1.			Rule premice) med premice) EP (prod) (one)
ℚ.	TRVP	P	
ર્રા, શ્રુ રૂ.	P	T	TP, PVQ => Q
4.	P-> (Q->S)	P	
बि,49 ह.	9-5	T	$P, P \rightarrow Q \Rightarrow Q$
6.	Q	P	
₹5,63 Y.	3		$P, P \rightarrow Q \Rightarrow Q$
Z1,73 8.	R-+S	CP	
2]. Delive -	the following	ws909 (2p:
	→ P→ (PAR)	U	
in P P-	· (R+(RAS)) =	· Q > S	
11) P+Q	=> P+ (PAQ)	. 9	The second second
11). TPVQ,	TQVR, R-S >	PYS	4.
i) P→a >	P> (PAQ)		
Step	Rem9908	Rule	
	P .	Prassu	med premise)
220		P-	
ર્વા, શ્રુ કે.	₹.	T	P, P > Q > Q
रा,३३ 4.	PAQ		P, Q > PAQ
5.	P-> (PAQ)	СР	





1)
$$P$$
, $P \rightarrow (Q \rightarrow (RAS)) \Rightarrow Q \rightarrow S$

Step Premises Rule

P(ASSumed premise)

1. Q

2. P

3. $P \rightarrow (Q \rightarrow (RAS))$ P

7. $P \rightarrow Q \Rightarrow Q$

723/4. $Q \rightarrow (RAS)$ T

P, $P \rightarrow Q \Rightarrow Q$

723/4. $Q \rightarrow (RAS)$ T

P, $P \rightarrow Q \Rightarrow Q$

723/4. $Q \rightarrow (RAS)$ T

P, $P \rightarrow Q \Rightarrow Q$

723/4. $Q \rightarrow (RAS)$ T

PAQ $\Rightarrow Q$

723/4. $Q \rightarrow Q$

724/63. $Q \rightarrow Q$

725/2. $Q \rightarrow Q$

726/2. $Q \rightarrow Q$

727/2. $Q \rightarrow Q$

728/2. $Q \rightarrow Q$

728/2. $Q \rightarrow Q$

738/2. $Q \rightarrow Q$

746/3. $Q \rightarrow Q$

75/2. $Q \rightarrow Q$

76/2. $Q \rightarrow Q$

77/2. $Q \rightarrow Q$

78/2. $Q \rightarrow Q$

79/2. $Q \rightarrow Q$

80/2. $Q \rightarrow Q$





		EXAME OR POST OF THE PROPERTY
Inconsisten	t proof.	
		HI, Ha,, Hm & Said
A 80	of premise	Han AHm >F which
Stands for a	Contradaction.	a A · · · · · · · · · · ·
80 11 411	A - A	in a se any
TO HINHS	N A Hm = A	197A, where revailable.
+ J. Plove Hood	t the premise	28 P→Q, Q→R, R→S
S-TR and	Pas are 90 co	nggstert.
Step	Premacos	Rule
1.	$P \rightarrow Q$	PA . IT I
2.	$Q \rightarrow R$	P
£1, 23 3.	$P \rightarrow R$	T Pad, A-R => P->
4.	8-77R	P
{A} 5.	R -> 7S	T P+A => 78->7P
73,536.	P->7S	T P+Q, A+R => P+1
7.	R->S	P
ZB 8.	TPVTS	T P-A A TPVA
7839.	7 (PAS)	T TRYTA > TIPME
a 62 a 10.	PAS	P
£9,109 11.	(2A9) A7 (PAC)	T P, a > PAQ
12.	F	T
	r.	- 0 D . 22 O 72
	the premace	8 P > 9, P > 8, 9 > 78,
pare 900	onsastent.	2 9 9
1.	P	P
2.	P->9	P
री, येपु 3.	9	T P, P+A P Q
4.	9.778	P
£3,4∫ 5.	78	T P, P> A > A
6. 263 7.	P-> TP	P P→0 0 70 →7P
(0) 1.	10-71	,





25,73 8. 7P T P, P+Q → Q
{1,83 9. PATP T P, R ⇒ PAR
10. F T PA7P → F
3] prove that the premises a + (b+c),
3) Prove that the premises on constitent.
7 1 1 1 1 1 1 1 1 1 1
3. $a \rightarrow (b \rightarrow c)$ $P \rightarrow a \rightarrow P \rightarrow a$
32,33 A. b→C
وراع 5. d
6. d→ (b) (b) T P, P→ R → A
15,63 7. DATC T(P→ Q) \$\ PATQ
27 0 1 DT U . PAO
$\{4,8\}$ 9. $(b \rightarrow c) \land 7 (b \rightarrow c)$ T
AJ. Show that the following premices are AJ. Show that the following premices are anconspetent. anconspetent. anconspetent.
AJ. Show that the following formers then growns getent. In Jack masses many classes through gillness, then I. It Jack masses many classes through gillness, then I. It Jack masses school. I. It Jack masses school.
anconspetent many Jasses through
1. It Jack masses many Jasses. 1. It Jack masses many Jasses. 1. It Jack masses many Jasses. 3. It Jack sasts high school, then he is uneducated. 2. It Jack leads a lot of books, then he is
he fasts Agh school, then he is he gasts high school, then he is a If Jack reads a lot of books, then he is a Jack reads a lot of books, then he is
3. It jack reads a losses through 911 ness not uneducated. 4. Jack masses many classes through 911 ness and reads a lot of books. and reads a lot of books.
many was bridged bridged
and reads a lot of through 911ness
and reads a lot of book through allness P: Jack macses many classes through allness P: Jack macses many classes through allness
a: Thek fails a lot of books
R: Jack 98 uneducated.
QS. U.





The premises are P > R, R > R, S > TR, PAS. App Premases Rule P MP face since to $Q \rightarrow R$ E1,83 3. PAR, RARE) PAR T PYR (=> TRY)7P T PAR, RAR PAR 7P V 7S T P-> Q -> TPVQ 7 (PAS) T 7(PAR) > TPV7Q PAS (PAS) AT (PAS) P, Q > PIQ 11 5. 1). If there is a ball game, then to a verifying was difficult. ii). If thely arrived on time their toavelling was not difficult. 111). They arrived on time iv). Therefore there was no ball game. Show that the above statements are Valed Statement. Let p: There was a ball game Q: Travelling was difficult R: They arrived on time. The premises are P+a, R -> Ta, R, The conclusion 98. Tp.





Step		Premase	8	Rul	enanting	1.8
١.	25	R	139		11 70 70 10	
2.	* * * * *	$R \rightarrow TQ$	Freship	P	V 1 - 3 - 5	
ર્ગે,શ્રુ કે.		70	de ave	T	$P, P \rightarrow Q =$	> a
4.		P>Q		P		ì
到,4岁后、		TP	35 - XTI 19	T	, P→0,7	Q=>7P