

*Assumption set:* The union of the assumption sets at lines  $m$  and  $n$ .

*Comment:* The order of  $m$  and  $n$  in the proof is irrelevant.

*Also known as:* *Modus Ponendo Ponens* (MPP), *Modus Ponens* (MP), Detachment, Affirming the Antecedent.

Example.

1	(1)	$P \rightarrow Q$	A
2	(2)	P	A
1,2	(3)	Q	1,2 $\rightarrow$ E

### arrow-intro

Given a sentence (at line  $n$ ), conclude a conditional having it as the consequent and whose antecedent appears in the proof as an assumption (at line  $m$ ).

*Annotation:*  $n \rightarrow \mathbf{I}(m)$

*Assumption set:* Everything in the assumption set at line  $n$  excepting  $m$ , the line number where the antecedent was assumed

*Comment:* The antecedent must be present in the proof as an assumption. We speak of **DISCHARGING** this assumption when applying this rule. Placing the number  $m$  in parentheses indicates it is the discharged assumption. The lines  $m$  and  $n$  may be the same.

*Also known as:* Conditional Proof (CP).

Examples.

(a)

1	(1)	$\sim P \vee Q$	A
2	(2)	P	A
1,2	(3)	Q	1,2 $\vee$ E
1	(4)	$P \rightarrow Q$	3 $\rightarrow$ I(2)

(b)

1	(1)	R	A
2	(2)	P	A
1	(3)	$P \rightarrow R$	1 $\rightarrow$ I(2)