Rule Name	What You Need	How to Cite (Annotate) It	Assumption Set	Example
&I	2 lines, *m* and *k*	*m, k* &I	Include all assumptions from lines *m* and *k*	1 (1) A A 2 (2) B A 1,2 (3) A&B 1,2&I
&E	1 line *m* : must be a conjunction	*m* &E	Include all assumptions from line *m*	1 (1) A&B A 1 (2) A 1&E
vI	1 line *m* : can be anything	*m* vI	Include all assumptions from line *m*	1 (1) P A 1 (2) PvQ 1vI
vE	2 lines, m and k: *m* must be a disjunction, and *k* must be the denial (negation) of one of the disjuncts in *m*. *Conclude remaining disjunct.*	*m, k* vE	Include all assumptions from lines *m* and *k*	1 (1) PvQ A 2 (2) ~Q A 1,2 (3) P 1,2vE
->I	2 lines, *m* and *k: m* must be an assumption, and *k* can be any line. *Conclude a conditional of the form (m->k), and discharge the assumption at m.*	*k* ->I (*m*)	Include all assumptions at *k* except for *m*	1 (1) P A . . . 2,3 (5) Q&R 2,3 &I 2,3 (6) P->(Q&R) 5->I(1)
->E	2 lines, *m* and *k: * m must be a conditional, and *k* must be the antecedent of the conditional at *m*. *Conclude consequent of conditional at m.*	*m, k* ->E	Include all assumptions from lines *m* and *k*	1 (1) P->Q A 2 (2) P A 1,2 (3) Q 1,2->E
<-> I	2 lines, *m* and *k: m* must be a conditional of the form (P->Q), and *k* must be a conditional of the form (Q->P)	*m, k* <->I	Include all assumptions from lines *m* and *k*	1 (1) P->Q A 2 (2) Q->P A 1,2 (3) P<->Q 1,2 <->I
<-> E	1 line *m* : must be a biconditional of the form (P<->Q). *Conclude either P->Q or Q->P.*	*m* <->E	Include all assumptions from line *m*	1 (1) P<->Q A 1 (2) P->Q 1 <->E
RAA	2 lines, *m* and *k* , that contradict each other, and a line *l* that is an assumption (*l* can be the same as lines *m* or *k*). *Conclude the denial of l, and discharge the assumption at l .*	*m, k* RAA (*l*)	Include all assumptions at *m* and *k* except for *l.*	1 (1) P A 2 (2) ~P A 1 (3) ~~P 1,2 RAA (2)
∀I	1 line *m* : must be a sentence with at least one name embedded in a predicate letter. *This name cannot appear in any of the lines in the assumption set at m . Conclude a universally quantified sentence with the name replaced by an universally bound variable.*	*m* ∀I	Include all assumptions from line *m*	1 (1) ∀xPx A 1 (2) Pa 1∀E 1 (3) Pa v Ga 2vI 1 (4) ∀x(PxvGx) 3 ∀I
∀E	1 line *m* : must be a universally quantified sentence. *Conclude any instance of m.*	*m* ∀E	Include all assumptions from line *m*	1 (1) ∀xPx A 1 (2) Pa 1∀E
∃I	1 line *m* : must be a sentence with at least one name embedded in a predicate letter. *Conclude an existentially quantified sentence with the name replaced by an existentially bound variable.*	*m* ∃I	Include all assumptions from line *m*	1 (1) Pa A 1 (2) ∃xPx 1 ∃I
∃E	3 lines *m, k l: m* must be an existentially quantified sentence, *k* must be an assumed instance of *m* , and *l* must be a sentence that does not contain the name instantiated at *k*. *This name cannot appear in sentence m, sentence k, or in any of the assumptions at k except for m. Conclude a sentence that repeats the content at line l, and discharge m.*	*m, l* ∃E (*k*)	Include all assumptions from lines *m* and *l* except for *k.*	1 (1) ∃xPx A 2 (2) Pa A 2 (3) PavGa 2vI 2 (4) ∃x(Px v Gx) 3∃I 1 (5) ∃x(Px v Gx) 1,4 ∃E (2)