Syllogism Forms

Janet Davis, from VanDrunen (2013), sections 3.8 and 3.14

September 26, 2017

Modus ponens

$$\begin{array}{r} p \to q \\ p \\ \hline \therefore\ q \end{array}$$

Modus tollens

$$\begin{array}{r} p \to q \\ \sim q \\ \hline \therefore \sim p \end{array}$$

Elimination

$$\begin{array}{r} p \vee q \\ \sim p \\ \hline \therefore\ q \end{array}$$

Contradiction

$$\begin{array}{r} p \to F \\ \hline \therefore \sim p \end{array}$$

Generalization

$$\begin{array}{r} p \\ \hline \therefore\ p \vee q \end{array}$$

Specialization

$$\begin{array}{r} p \wedge q \\ \hline \therefore\ p \end{array}$$

Transitivity

$$\begin{array}{r} p \to q \\ q \to r \\ \hline \therefore\ p \to r \end{array}$$

Division into cases

$$\begin{array}{r} p \vee q \\ p \to r \\ q \to r \\ \hline \therefore\ r \end{array}$$

Universal modus ponens

$$\begin{array}{r} \forall x \in A, P(x) \to Q(x) \\ a \in A \\ P(a) \\ \hline \therefore\ Q(a) \end{array}$$

Universal modus tollens

$$\begin{array}{r} \forall x \in A, P(x) \to Q(x) \\ a \in A \\ \sim\ Q(a) \\ \hline \therefore \sim\ P(a) \end{array}$$

Universal instantiation

$$\begin{array}{r} \forall x \in A, P(x) \\ a \in A \\ \hline \therefore\ P(a) \end{array}$$

Universal generalization

$$\begin{array}{r} \text{Suppose } a \in A \\ P(a) \\ \hline \therefore\ \forall\ x \in A, P(x) \end{array}$$