

Transcript of “Symbolic Logic Rap” by Ewan Kingston
video and slides: <https://ewan-kingston.net/symbolic-logic-rap/>

- Rules are those used in *Power of Logic* by Howard-Snyder, Howard-Snyder and Wasserman (McGraw Hill)
- Not included – Quantifier Negation, Identity.
- You might learn a slightly different collection of rules in your class or textbook, or use different names for the same rules.

[8 Implicational rules]

8 implicational rules, use them only on whole lines they're powerful tools.

When two things are your options and suddenly one isn't/ That's DS – **Disjunctive Syllogism**.

If p then q...p Whaddya get?/ q: **Modus ponens**, its famous, don't forget.

If p then q, but want not p then?/ If you have not q you can, that's **Modus Tollens**.

Now two conditionals make a single chain/ From the first to the last, **Hypothetical syllogism**'s the name.

Constructive dilemma's a 4 line move/ p or q to r or s via conditionals, 2

Conjunction's in the name, you get to use one/ If you have both sides of the conjunction.

Simplification is the reverse indeed/ p and q splits to p (or q) alone as you need.

Addition is a weird thing/ p gives you p or anything

8 implication rules, don't run em in reverse. You want rules like that? They're in the next verse.

[10 Equivalence rules]

Equivalence rules work both ways. The first statement says what the second one says.

If you want two tildes, use **Double Negation**/ It also works for two-tilde elimination

Commutation is easy/ Just see p or q as q or p [same with and]

Association shuffles the parentheses/ It only works with all dots and all vees

DeMorgan's laws: for “not both” and neither-nor/ Drop/add parentheses, swap ands and ors

With the material conditional, you can do a lot/ **Contraposition** switches the order and adds two nots.

If you have p v p, you can have p for free/ p gives “p and p” that's **Redundancy**

Got a conjunction for an antecedent? /**Export** one side to be a prior antecedent.

Sharing's caring – **Distribution** can give you more/ One P is distributed across an and or an or.

Material implication – an arrow to a v/ You just gotta negate the antecedent, see?

Biconditionals are changed by **Material Equivalence**/ p if q and only if q, you see its relevance

It's also equivalent to either-both-or-neither/ Check the truth table if you're not a believer

You can use equivalence rules on parts of lines/ Good for when that proof is giving you hard times.

[4 rules of predicate logic]

To deal with quantifiers, four new rules/ Two of them fussy, two of them cool

All means everything single thing/ So **instantiate** a **universal** with no restrictions

If it happens to this, it happens to something, agree?/**Existential Generalization**: EG

Existential Instantiation brings a cameo/ Constant comes from nowhere then away it goes

UG lets you generalize from anything/ If you only know about the instance what you know about everything

22 rules for natural deduction proofs/ They can show validity because they preserve truth