proposition: predicate w/o quantifier is not a proposition (i.e. x = 0 w/o for all/there exists x is not a proposition) rows = 2^n, n = num of predicates

nega: ***always*** negate quantifiers

quantifier/logic translation: ***always*** use:

quantifier scoping:

Distributing quantifier:

Nested quantifier: demorgan is done one layer after another:

Only distribute

Useful demorgans/equivalence laws:

De Morgan's Law for quantifiers:

A close-up of a math test

Description automatically generated

De Morgan's Law:

Definition of →:

Idempotent Laws:

Distributive Law:

Absorption Laws:, this is because only needs at most one to be true

Impl breakout/contrapos: (***always breakout first to simplify stuff***)

Nega impl:

A screenshot of a cell phone

Description automatically generatedA table of mathematical equations

Description automatically generated

Tautology/must be true

counterexamples think:

, false, x cannot be (should also check for zero)

, false, x can be a fraction.

, false,

Proof 101:

***always*** prove/disprove for all instead of there exists, then let vars be arb. type of num

to disprove P(x)=prove (is true)

by contradiction: seeking contradiction, assume the (negation)

by cases: blah, then (WLOG) all cases exhausted

by contrapos: assume contrapo

truth table finding: if mostly false, then its , ; if mostly true, then its ; if its half false & true, then its

Sets:

Cardinality: num of elements in a set. Just be careful with which one gets subtracted from

disjoint sets

Sets proof 101:

Subset method: show that each side of the identity is a subset of the other side.