substitution instance
  - an argument that results from uniformly replacing the variables in that argument form with statements

valid argument form
  - a form in which every substitution instance is a valid argument

formally valid argument
  - one that is valid because of its form
    - if the premises are true, the conclusion must be true!

*necessary truth: a statement that cannot be false
  - i exist. so, bachelors are unmarried.
    - conclusion is a necessary truth – it is valid. the validity has nothing to do with the form and everything to do with the content of the conclusion.

conditional statement
  - an if-then statement
    - if... [antecedent],
    - then... [consequent]
  - hypothetical
    - can be true even if the antecedent or consequent is false

antecedent
  - if-clause of a conditional

consequent
  - then-clause of a conditional

stylistic variants
  - alternate ways of saying the same thing
  - stylistic variants on “if...then”:
    - given that a, b.
    - assuming a, b.
    - b if a.
      - a is a sufficient condition (enough) for b
    - b given that a.
    - b assuming a.
    - a only if b.
      - b is a necessary condition (requirement) for a
    - ^ convert to “if...then”

*modus tollens* (valid)
  - 1. If A, then B.
  - 2. Not B.
  - 3. So, not A.

*hypothetical syllogism* (valid) x = y, y = z, x = z
  - 1. If A, then B.
  - 2. If B, then C.
• find out whether the argument is valid or invalid

negations

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<thead>
<tr>
<th>p</th>
<th>~p</th>
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<tbody>
<tr>
<td>T</td>
<td>F</td>
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p: opposite truth value

conjunctions

\[ p \land q \]

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<tr>
<th>p / q</th>
<th>p . q</th>
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<tr>
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p . q: always false except when both conjuncts are true

disjunctions

*inclusive disjunction:

\[ p \lor q \]

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<tr>
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p v q: always true except when both disjuncts are false

material conditionals

*if the antecedent is true and the consequent is false, then the conditional as a whole is false
*the material conditional: a type of conditional as being false only when the antecedent is true and the consequent is false

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