Analyzing arguments without quantifiers using truth table

- Procedure
  - Step 1: ____________________________________________________________
  - Step 2: ____________________________________________________________
  - Step 3: ____________________________________________________________
  - Step 4: ____________________________________________________________

- Example 0.
  If the floor is dirty, I must mop it.
  The floor is dirty. __________
  I must mop it.

  Truth table:
  
  The argument is ____________________________

- Modus ponens -- The law of detachment -- is an argument of the form

- The pattern of reasoning in Example 0 is ____________________________

- Example 1.
  If my check arrives in time, I’ll register for the fall semester.
  I registered for the fall semester. ____________________________
  My check arrived on time.

  Truth table:
The argument is ___________________________

- **A fallacy of the converse** is an argument of the form

- The pattern of reasoning in Example 1 is ___________________________

- **Example 2.**
  - If a man could be in two places at one time, I’d be with you.
  - I am not with you. __________________________________________
  - A man can’t be at two places at one time.

  Truth table:

<table>
<thead>
<tr>
<th>P</th>
<th>Q</th>
<th>P → Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>T</td>
</tr>
</tbody>
</table>

The argument is ___________________________

- **Modus tollens -- the Law of Contraposition** -- is an argument of the form

- The pattern of reasoning in Example 2 is ___________________________

- **Example 3.**
  - I’ll buy a car or I’ll take a vacation.
  - I won’t buy a car. ____________
  - I’ll take a vacation.

  Truth table:

<table>
<thead>
<tr>
<th>P</th>
<th>Q</th>
<th>P ∨ Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>

The argument is ___________________________
A disjunctive syllogism is an argument of the form

The pattern of reasoning in Example 3 is _________________________________

Example 4.
If it squeaks, I’ll use WD-40.
If I use WD-40, I must go to the hardware store.
If it squeaks, I must go to the hardware store.

Truth table:

The argument is _________________________________

Reasoning by transitivity – the Law of Hypothetical Syllogism -- is an argument of the form

The pattern of reasoning in Example 4 is _________________________________

A numeration system is a way of _________________________________

Various numeration systems developed over many thousands of years and were used by the

______________________________

We use the _________________________________
• Early Egyptian system (simple grouping)
  - Symbols 1:____, 10:____, 100:____, 1000:____, 10,000____, 100,000:____,
    1,000,000:____
  - Symbols represent powers of 10 from _____through ______ (a base 10 system)
    - Example 1. Write the number on the screen in Hindu-Arabic form.

  - Example 2. Write the numeral 376,248 in Egyptian form.

  - Arithmetic in early Egyptian
    - Example 3. Work the subtraction problems on the screen
      a.
      b.
• Ancient Roman system (grouping system)
  
  
  o Additive/subtractive features
    
    a. 
    
    b. 
  
  o Multiplicative features
    
    a. 
    
    b. 

• Classical Chinese system (multiplicative grouping)
  
  o Special features
    
    a. 
    
    b. 
    
    c. 
  
  o Example 7. Express each Chinese numeral on the screen in the Hindu-Arabic system
    
    a. 
    
    b. 
    
    c.
- **Hindu-Arabic system (positional)**
  - Each symbol is called a __________, which conveys two things:
    - __________ value, which is ____________________________
    - __________ value, which is ____________________________
  - The symbol “0” serves as a placeholder when______________________________

- Expanded form uses ________________to express the value of the digit in each position
  - **Example 2.** Write each number in expanded form.
    - a. 924 =
    - b. 1906 =
    - c. 46,424 =

- **Example 8 (reading an abacus).** What number is shown on the abacus in Figure 8, p. 154?
Adding and subtracting expanded forms

- **Example 4.** Use expanded form to add 23 and 64.

- **Example 5.** Use expanded form to subtract 254 from 695.