Section 6.1 How Do We Reason?

We make arguments, where an *argument* is a sequence of statements, called *premises*, followed by a single statement, called the *conclusion*.

The hope is that we make valid arguments, where an argument is *valid* if the truth of the premises implies the truth of the conclusion.

We can use rules of logic to make valid arguments.

The most common rule of logic is *modus ponens* (mode that affirms). If *A* and *B* be are statements and "if *A* then *B*" and *A* are both true, then we can conclude that *B* is true.

Quiz. How did you learn the modus ponens rule as a child?

When a conclusion is made that does not follow from the premises the reasoning is called a *non sequitur* (it does not follow).

Quiz. What is a non sequitur that you have observed?

Some dictionary-type definitions of *logic*:

- The study of the principles of reasoning, especially of the structure of statements and of methods to determine their validity.
- A system of reasoning.
- Valid reasoning.

A *calculus* is a language of expressions, where each expression has a value and there are rules to transform one expression into another that has the same value.