

PRAYER

Most blessed Lord, send the grace of Your Holy Spirit on me to strengthen me that I may learn well the subject I am about to study and by it become a better person for Your glory, the comfort of my family, and for the benefit of Your Church and the world.

Amen.

AXIOMATIC SYSTEM

- Based on deductive reasoning
- Statements used in an argument must be derived, or based upon, prior statements used in the argument. These prior statements must themselves be derived from even earlier statements, and so on.

TRAPS

- Producing a never-ending stream of prior statements.
 - ex. The definition of a word in the dictionary. If we want to define a word like orange, we need to use other words such as fruit and round. To define fruit we need to use seed, and so forth.
 - Every word required a different word in its definition, then we would need an infinite number of words!
- Circular reasoning
 - Ex. In some dictionaries, a line is defined as a type of curve, and a curve is defined as a line that deviates from being straight.

SOLUTION

- The Greeks recognized these traps and realized that the only way out of these logical dilemmas was to establish a base of concepts and statements that would be used without proof. This base consisted of undefined terms and postulates/axioms.
- Undefined terms were those terms that would be accepted without any further definition.
 - ex. “Breadth” and “length”
- Starting from a base of undefined terms and agreed axioms, we can define other terms and use our axioms to argue the truth of other statements – called theorems.

EXAMPLES

- Chess

- We could consider the playing pieces (as black and white objects) and the **chessboard as undefined parts** of the game. They just exist and we use them.
- A particular **playing piece**, for example the bishop, would be a **defined term**, as it would be a special kind of playing piece.
- The **rules** of chess would be **axioms**. The rules are the final say in what is allowed and what is not allowed in playing the game. Everyone (hopefully) agrees to play by the rules.
- Once the game starts, a player moves about the board, capturing his or her opponent's pieces. A particular **configuration of the game**, for example with one player holding another player in check, would be like a **theorem** in the game in that it is derived from the axioms (rules), using the defined and undefined terms (pieces) of the game, and it is a configuration of the game that can be verified as legal or not, using the rules.