

Math 113 homework due 2/6

I, for one, didn't define 'polyhedron'. I assumed familiarity with the concept, i.e. the ability to distinguish a thing which is a polyhedron from a thing which is not a polyhedron – what some logicians call knowing the extension of the concept

– in Lakatos

- (1) Read the “Proofs and Refutations” reading carefully, and the sections on Euler’s formula and regular polyhedra in chapter 13 of the textbook.
- (2) Compare the proof of Euler’s formula from the course notes to the proof we did in class. How do they differ and how do they agree?
- (3) Now compare the proof (the first one) from “Proofs and Refutations” to the proof we did in class. How do they differ and how to they agree?
- (4) Questions on “Proofs and Refutations”:
 - (a) What is a *local* counterexample and what is a *global* counterexample? Distinguish between the two.
 - (b) What is wrong with definition P ?
 - (c) What is the definition of “proof” that is (somewhat implicitly) given in the dialogue? What makes a mathematical proof? Do you agree with this definition or not?
 - (d) (Challenging - do your best to provide an answer or an explanation of your thinking) Why did our picture-frame polygon satisfy Euler’s formula, while the one in the dialogue did not?
- (5) By modeling our proof from class, show that there is exactly one regular polyhedron with pentagonal faces.