MATHEMATICAL MISTAKES

JERZY POGONOWSKI

Department of Logic and Cognitive Science
Adam Mickiewicz University in Poznań
pogon@amu.edu.pl

The talk is divided into two parts. First of them concerns a few famous mistakes discovered in the history of mathematics. The second part is a brief summary of mistakes typical for the students of humanities who attend a mathematically oriented course.

Famous mistakes became famous mostly because they contained roots of subsequent mathematical discoveries. New ideas are frequently born in situations in which one struggles with an antinomy or tries to explain a paradox. Resolution of paradoxes, in turn, reveals new, more subtle intuitions. We will discuss a few examples from algebra, topology and analysis illustrating these processes.

The second part of the talk is based, among others, on our experiences in teaching introduction to mathematics for freshmen in cognitive science as well as in teaching mathematical problem solving for more advanced such students. We will discuss the observed cognitive biases of these students which, in our opinion, are connected with e.g.: misuse of language, illegitimate reduction of abstract notions to more basic ones, too rigid application of intuitions imposed by the school to new mathematical contexts. It should be stressed that we limit ourselves to analysis of mistakes made by students and we do not formulate any claims about mathematical education of children.