

PARADOX RESOLUTION AS A DIDACTIC TOOL

[ABSTRACT]

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We share with the audience a few reflections concerning our course *Mathematical Puzzles* offered mainly to the students of cognitive science at the Adam Mickiewicz University in Poznań, Poland. Contrary to the usual mathematical exercises, math puzzles are often connected with that which is unexpected, which contradicts our common-day experience. Thus, such puzzles are instructive as far as a critical attitude towards informal intuitions is concerned. They teach us that we should be cautious in relying on these intuitions which are sometimes very illusory.

Observing the students' activity during our course we have noticed that it is much more easier for them to acquire small concise chunks of dissipated knowledge rather than to listen to lengthy expositions of whole theories only accidentally illustrated with examples.

The puzzles are divided into thematic groups, including such topics as: the Infinite, numbers and magnitudes, movement and change, shape and space, orderings, patterns and structures, algorithms and computation, probability, logic. Many of them are connected with paradoxes, i.e. results which seem counterintuitive but are nevertheless true, which can be shown by resolving the paradox in question.

We claim that paradox resolution is very instructive as far as the development of correct mathematical intuitions is concerned. Obviously, one should use several standard (normal, typical, natural) exercises in teaching mathematics – they doubtlessly serve as proper tools for stabilization of intuitions. However, to see clearly the limitations of our mathematical intuitions we should investigate also the objects which – for several reasons – are called *pathological* in mathematics. Such objects usually become later domesticated, thus leading to new mathematical domains.

We are going to present several examples of math puzzles in our talk. We have selected most funny puzzles, hoping that the audience will share with us the joy of solving them.