

Mathematics and Puzzles

As children, we all loved mathematics and working out puzzles. Mathematics was an all-important tool to answer questions, like "How many," "Who is older," "Which is larger." And puzzles were of course everywhere. We did not stop to check a dictionary to ascertain that a puzzle is something, such as a toy or game, that tests one's ingenuity. We did not care about our ingenuity a little bit, but just thrived on learning new things and skills that the nature made us curious about. Growing up was a great fun. Time brought a change. In school we were made to realize that learning is a serious business, and for many of us much of it has ceased to be entertaining. Although not for all. Some could not give up their erstwhile pursuits of mental entertainment. There are enough of puzzle lovers to provide a living for the selected few who invent and publish puzzles - in accordance with the dictionary definition to challenge one's ingenuity, puzzles old and new. The luckiest of the breed grew to become scientists, mathematicians in particular. Mathematicians solve puzzles as a matter of vocation. Puzzlists seek puzzles in newspapers, books, and now on the Web. There are many kinds of puzzles - jigsaw puzzles, slider puzzles, sliding blocks puzzles, logic puzzles, mazes, cryptarithms, crosswords, strategy games, dissections, magic squares - it's hard to enumerate all known kinds. Puzzlists and mathematicians have their preferences. Most of mathematicians will probably deem classification of their occupation as puzzle solving a misnomer. (Due to their mindset they will likely to inquire as to the definition of puzzle solving - just in case.) Mathematicians call their puzzles problems. Solved problems become lemmas, theorems, propositions. Why would they object to being categorized as puzzlists? Solving both puzzles and mathematical problems require perseverance and ingenuity. However, there is a profound difference between solving puzzles and what mathematicians do for a living. The difference is mainly that of the attitude towards either activity. For a puzzlist, solving a puzzle is a goal in itself. For mathematician, solving a problem is an enjoyable and a desirable occupation but is seldom (with the exception, for instance, of great problems of a long standing, like Fermat's Last Theorem) a satisfactory achievement in itself. In most cases after solving a problem mathematician will try something else: modify or generalize the solved problem, seek another proof - perhaps simpler or more enlightening than the original one, attempt to understand what made the proof work, etc., which will lead him to another problem and so on. Whatever he does, he eventually gets a hierarchical network of interrelated solved problems - a theory. Why does mathematician seek new problems? The reason is in that mathematics, even if perceived by many as a not very meaningful manipulation of abstract symbols, embodies in its abstractedness a rare power of explanation. Some mathematics directly explains natural phenomena, some sheds light on other portions of mathematics or other sciences. (A famous Russian mathematician V.I. Arnold even categorized mathematics as that part of physics in which experiments are inexpensive.) Understanding in mathematics is born not only from formulas, definitions and theorems but, and even more so, from those networks of related problems. The process is very much like distilling the many meanings of a word in a Thesaurus into a unique shade of the concept that it represents. Mathematics - the most exact science of all - is least of all a dictionary of term definitions. Mathematicians seek knowledge. In search of knowledge, they enjoy themselves tremendously inventing and solving new problems. The [Interactive Mathematics Miscellany and Puzzles](http://www.edarticle.com) site makes an attempt to present mathematics as an evolving and entertaining subject in which an unsuspecting visitor may take an active part.

About the Author

Dr. Alexander Bogomolny is a former associate professor of mathematics at the University of Iowa and currently a developer of an award winning site Interactive Mathematics Miscellany and Puzzles. The site is an encyclopedic collection of K12 math articles, problems, puzzles, computer magic, illusions and much more. More than 800 interactive Java applets enliven the discussions and help foster students' desire for problem solving. Her received his M.S. in Mathematics from the Moscow State University in 1971 and Ph.D. in Mathematics from the Hebrew University of Jerusalem in 1981.

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