Mathematics as a Creative Enterprise

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Mathematics is similar to other academic disciplines in that success at an advanced level requires a high level of creativity. But mathematics differs from at least some other disciplines, including STEM disciplines, in that creativity often is not highly rewarded at the lower and intermediate levels. For example, many natural-science students, even in middle or high school, do science projects, which give the students a taste of what the scientific enterprise is like. Engineering students, even at the earlier levels, invent things, such as a robot that swims. Technology students often build things, such as circuit boards. Mathematics students, in contrast, more rarely engage in creative work. Often, they come to believe that there is only one “right” way to solve a problem and that all other ways are wrong. This is bad not only because the students do not develop creative thinking in mathematics, but also because early success in mathematics is less likely than in other disciplines to presage later success because it requires such a different and more limited set of thinking skills.

In this exchange, we will explore ways in which to encourage creative thinking in math. I will discuss (a) what creativity is, (b) what the thinking skills and attitudes are that lead to creativity, and (c) examples of the kinds of problems my colleagues and I have given students to assess creative thinking in the mathematical domain. Audience members will be actively involved in the presentation to reflect on ways to develop creative thinking in the context of their own classrooms.