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Beyond Lǎozǐ: the goals and means of mathematics instruction.

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Summary: The goal of this essay is to present what the author sees as the main goal of mathematics instruction, and the use of mathematical Olympiads in bringing instruction closer to ‘real’ mathematics and identifying young talents. One of the principle goals of mathematics instruction ought to be showing in a classroom what mathematics is and what mathematicians do. This cannot be achieved by teaching but rather by creating an environment in which students learn mathematics by doing it. As in ‘real’ mathematics, this ought to be done by solving problems that require not just plugging numbers into memorized formulas and one-step deductive reasoning, but also by experimenting, constructing examples, and utilizing synthesis in a single problem of ideas from various branches of mathematics, built on high moral foundations. The author’s seven recent Springer books present fragments of ‘live’ mathematics and history, and illustrations of these ideas. The essay includes some problems used at the Colorado Mathematical Olympiad over the past 33 years as illustrations of ideas presented here. The essay is naturally divided into two parts: goals and means.

Classification: D30 D20

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