

Why Discrete Math Is Important

By David Patrick

Most middle and high school math curricula follow a well-defined path:

Pre-algebra → Algebra 1 → Geometry → Algebra 2 → Trig/Pre-calculus → Calculus

Other middle and high schools prefer an “integrated” curriculum, wherein elements of algebra, geometry, and trigonometry are mixed together over a three- and four-year sequence. However, both of these approaches generally lack a great deal of emphasis on discrete math: topics such as combinatorics, probability, number theory, set theory, logic, algorithms, and graph theory. Because discrete math does not figure prominently in most states’ middle or high school “high stakes” progress exams, and because it also does not figure prominently on college-admissions exams such as the SAT, it is often overlooked.

However, discrete math has become increasingly important in recent years, for a number of reasons:

Discrete mathematics is essential to college-level mathematics and beyond.

Discrete math—together with calculus and abstract algebra—is one of the core components of mathematics at the undergraduate level. Students who learn a significant quantity of discrete math before entering college will be at a significant advantage when taking undergraduate-level math courses.

Discrete mathematics is the mathematics of computing.

The mathematics of modern computer science is built entirely on discrete math, in particular combinatorics and graph theory. This means that in order to learn the fundamental algorithms used by computer programmers, students will need a solid background in these subjects. Indeed, at most universities, an undergraduate-level course in discrete mathematics is a required part of pursuing a computer science degree.

Discrete mathematics is very much “real-world” mathematics.

Many students’ complaints about traditional high school math—algebra, geometry, trigonometry, and the like—is “What good is this for?” The somewhat abstract nature of these subjects often turns off students. By contrast, discrete math, in particular counting and probability, allows students—even at the middle school level—to very quickly explore nontrivial “real-world” problems that are challenging and interesting.

Discrete mathematics shows up on most middle and high school math contests.

Prominent math competitions such as MATHCOUNTS (at the middle school level) and the American Mathematics Competitions (at the high school level)

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