

IN DISCRETE MATHEMATICS

Using Discrete Mathematics in the Classroom

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Speaking Discretely...

Robert Hochberg

One of the themes of this issue is “voting.” The lead article by Joe Malkevitch and T.C. Wu discusses ranking the students in a classroom and reveals some surprising consequences of dropping the lowest grade. Paul Dreyer’s article on page 9 outlines an interesting method for polling a group of students without any student having to reveal his or her actual opinions. Thus a pollster would be able to poll people on sensitive issues without individuals needing to reveal personal information. Another theme of this issue is geometric patterns. On page 5, Kerry Simmons relates her success with tessellations in the kindergarten, and on page 10, Suzanne Foley and Deborah Franzblau give hints for using quilts as a vehicle for introducing discrete math into the classroom.

Judy Ann Brown begins a new regular feature on Internet resources, and Janice Kowalczyk reviews books which can be used in conjunction with teaching DM. We have also included humorous (and true) classroom anecdotes as space provided. Please send yours for future issues!

Please share the announcements on pages 4, 6, 11 and 12 with your colleagues. There are excellent programs to help teachers in your district become more acquainted with DM, especially the “Workshops in your District” program.

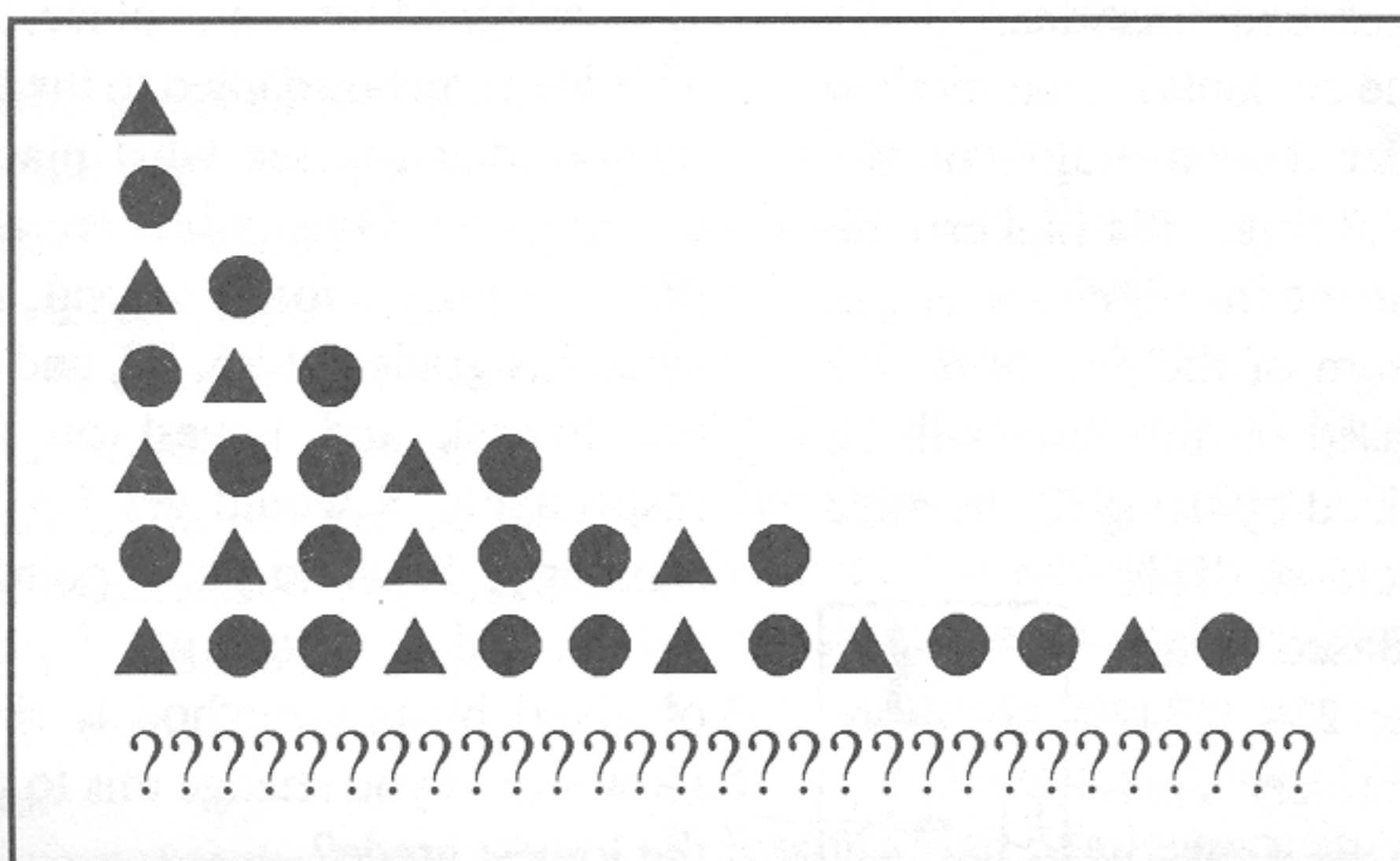
Is Dropping the Lowest Grade Fair?

Joseph Malkevitch and T.C. Wu

It is common for students, say, high school students in what follows, to request instructors to determine their final grades by dropping the lowest test grade that each student got. Presumably this suggestion is based on the idea—similar to the notion of a crime without victims—that no one is “hurt” by doing this. The purpose of this note is to examine the procedure “drop the lowest grade” from a mathematical modeling point of view so as to determine whether or not it is indeed true that no one is hurt by this practice, and to consider the pros and cons of this procedure.

Historically, mathematics has been taught from the point of view of developing different mathematical techniques, often without relation to contexts. This approach sometimes results in students’ not thinking as much as they might about what they are learning. As will be seen from the discussion below, various mathematical ideas emerge out of the situation we have posed concerning dropping a student’s lowest grade.

In examining the question of whether or not to drop a student’s lowest grade, it is reasonable to ask about what the context involved. If a teacher uses the system of converting numerical averages to letter grades using fixed ranges for each letter (i.e. 60–69 = D, 70–79 = C, etc.), then the procedure of dropping a student’s lowest grade will result in all students getting at least as high a grade as they would have otherwise. (Have your students show this is true.) The students may think that this is nice, but it does result in grade inflation for the school as a whole if all the instructors adopt this policy. The consequence of this may be that colleges who admit students from this high school are less likely to think highly of its applicants. Rather than no one at the high school being hurt, all students who apply to college may be hurt. It is “system” thinking of this kind that mathematical modeling exercises can encourage. Alternatively, if a teacher curves his grades, the grade a student gets is arrived at by assigning A’s to a certain percentage of students, B’s to a certain percentage, etc. (One way to grade on the curve might be to assign 10% A’s, 20% B’s, 40% C’s, 20% D’s and 10% F’s.) Teachers who grade on the curve must arrange their students in a rank ordering from



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