

Alabama Statewide Mathematics Contest: 2001 Comprehensive Exam

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The Mathematics Department of Jacksonville State University directed the first round of the Alabama Statewide Mathematics Contest in March 2001 for the 4th consecutive year. A total of 62 schools from across the state of Alabama competed in the event. The teams were divided into three divisions according to school size, and awards were presented in each division to the top teams and individual performers in each category. The competition was based on exams in Algebra, Geometry, and Comprehensive Mathematics; and a different version of the Comprehensive Exam was administered for each division. Each test consisted of fifty multiple choice questions. The scores were computed by awarding 5 points for each correct answer and 1 point for each problem omitted. Therefore, a test with all questions answered correctly received a score of 250, and a test with all questions answered incorrectly received a score of 0. Although there were no perfect scores in the competition, one student in Division I Geometry answered 49 problems correctly and omitted only one problem.

This article will focus on the Comprehensive Exam, which included questions from many areas of high school mathematics, including algebra, geometry, trigonometry, probability and statistics, number theory, and discrete mathematics. The majority of the questions were aimed at the mainstream secondary mathematics curriculum. In some questions, however, a new term or operation was defined to test the students' capacity for adaptation of known concepts. There were two such cases (#5,#7) on the Division I exam, and the students' success was relatively high (45% and 52%

respectively). There were only 16 other problems on this exam which were answered correctly by more than 50% of the students.

One main goal of constructing an exam for a mathematics contest is to clearly define a winner. Challenging questions must be included to distinguish between the top performers, and yet more fundamental questions are also necessary to give all students a chance to be competitive. In the Division I category, the winner scored 240, and all top ten scores were above 220. Although these scores were very close, there were no ties. The Division II category did have two students tie for first place with a score of 206 as well as two students with the same score, 194, in third place. Thus, the distribution of top scores in Division II was not as even as in Division I, and perhaps there is room for improvement in this area.

It is only fitting that we analyze the distribution of questions, according to level of difficulty. We will briefly consider the distribution of questions of the Division I exam, which is appears in this issue of the *Journal*. Thirty-five questions were clustered in the moderate difficulty level, based on the criterion of a correct response rate of at least 20% but not more than 60%. The extremes, however, were composed of seven questions answered correctly by fewer than 20% of the students and eight questions answered correctly by more than 60% of the students. We should note that problems #33 and #46 were omitted by 85% and 78% of the students, respectively. Additionally, problem #30 was judged to be somewhat ambiguous, and was, therefore, counted as a correct answer for every test score. Despite these three questions, the exam appears to have yielded a satisfactory distribution of scores as well as clear winners in each category. It is our hope that the Alabama Statewide Mathematics Contest has benefited its participants both in mathematical appreciation and mathematical maturity.

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