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**Title:**

The creation of a "Calculator Neutral" College Algebra Examination for Assessment Purposes.

**Summary**

The College Algebra course taught at the University of Alaska Anchorage is part of the assessment of General Education courses. Since students use a variety of calculators, the faculty elected to write a "Calculator Neutral" assessment examination. This topic is of interest to teachers of College Algebra.

**Description**

The presentation will give the history of the assessment process at the University of Alaska Anchorage, a description of one of the courses under assessment, the problems encountered during the development of the assessment exam, and a summary of the results.

The Northwest Association of Schools and Colleges accredits the University of Alaska Anchorage. Outcomes assessment is now an integral part of accreditation by the Northwest Association of Schools and Colleges. Questions asked in the 1994 edition of the accreditation handbook included: What evidence is there that the skills improved or declined as a result of the program? How are these judgements rendered? Does the improvement (if any) appear permanent or transitory? How has the program been changed as a result of the assessment program? Has assessment improved the quality of the course? The University of Alaska Anchorage elected to begin assessment with the General Education courses. Math 107-College Algebra is a course in the Quantitative Skills category of the General Education Requirements and was selected for outcomes assessment. College Algebra at the University of Alaska Anchorage is a four-credit course, and the course description reads as follows:

**Covers equations and inequalities; function theory and applications; solution of equations greater than second degree; determinants and matrices; systems of equations and inequalities, including applications; logarithmic and exponential functions, including applications; graphs and equations of conic sections, including applications; binomial theorem; sequences and series; mathematical induction and combinatoric notation.**

Approximately 1100 students are enrolled in College Algebra at the University of Alaska Anchorage each academic year. The University of Alaska Anchorage consists of the main campus in Anchorage, three extended colleges at Kenai (with a branch at Kachemak Bay), Kodiak, and the Matanuska-Susitna Valley, two military sites in the Anchorage Bowl, and one extended Site at Eagle River, located between Anchorage and the Matanuska-Susitna Valley. Each semester, all faculty teaching the course at all sites and campuses submit a portfolio to the Department Chair, which includes syllabi, tests, and the faculty member's teaching philosophy. In order to ensure consistency across the curriculum at UAA, a common assessment exam is administered at all sites, and a common text is used in the Anchorage Bowl.

Assessment exams were initiated in fall 1995. Analysis of the results began in summer 1996. In summer 1997, in addition to analyzing results and writing the assessment exam for the following year, the committee selected a topic which students traditionally has trouble with (logarithms and exponentials), and produced a handout for classroom use.

In summer 1995, the College Algebra Assessment Subcommittee voted to prohibit students from using calculators during the Assessment Exam. Students petitioned the Department Chair to allow the use of calculators, since many students had purchased graphing calculators specifically for use in the course. Furthermore, students pointed out that most instructors allowed the use of calculators in the College Algebra course, and that most current textbooks incorporated the use of calculators. Faculty who taught using graphing calculators, also pointed out that the Advanced Placement AB and Bc Exams and SAT exam also allowed the use of calculators. The Department of Mathematical Sciences as a whole voted to allow any calculator, except those with a QWERTY keyboard, to be used in the College Algebra course effective spring 1997.

Since students were allowed to use any brand and model of calculator, except those noted above, the faculty elected to write assessment exams that did not give students using various brands and types of graphing calculators an advantage. For those students who could not or did not want to buy a graphing calculator, the department provided graphing calculators for use on tests.

Due to the number of students involved, and the logistics of giving the exam at several locations, it was decided that the assessment exam would be a multiple-choice exam. It should be noted that the assessment exam constituted only one third of the final exam. The other two thirds of the final exam and all the other components of evaluation were up to the discretion of the individual instructor. Most faculty give non-multiple choice exams and include many word problems on the exams.

The presentation gives specific examples written to make the college algebra assessment exams as calculator neutral as possible. I have not only changed many types of questions in the College