SPECIAL REPORT
of the
GENERAL EDUCATION COUNCIL
concerning
RECOMMENDED COURSES

Presented at the 513th
Regular Meeting of the Faculty Senate
September 21, 1995

COUNCIL MEMBERSHIP

Norman Aitken
Mokhtar Atallah
Michael Egan
Nancy Fitzpatrick
Susan Grady
Kevin Grennan
Kyle Hoffman
Melvin Janowitz
John Jenkins, Chair
Robert Laurence
Robert Moll
Martha Moran
Jose Ornelas
Jackie Pritzen
Jonathan Quick
Kathy Ryan
David Tukey
BASIC MATH SKILLS AND ANALYTIC REASONING

A general education program should provide all students with some enhanced capacity for analytic reasoning. Increasingly, the world is full of numerical information that every educated person must learn to process, evaluate and understand. Without certain basic skills in quantitative and analytical reasoning, full participation in modern society is difficult; indeed, an adequate appreciation of the information content of a daily newspaper often requires certain numeracy skills.

To ensure that all students possess these skills, two levels of this requirement must be fulfilled: (1) the demonstration of basic competence in college level mathematics; and (2) one course in analytical, formal, mathematical, quantitative, or numerical reasoning. The basic competence requirement is designated Basic Math Skills (formerly referred to as "Tier I") and the additional requirement Analytic Reasoning (formerly "Tier II").

Basic Math Skills

All entering students are required to take the Mathematics Placement Examination. A score appropriate for placement in MATH 104 or higher on the non-trigonometry part of the examination shall exempt a student from the Basic Math Skills requirement. Students who do not satisfy the requirement through this examination may do so by passing at the exemption level the Basic Math Skills Exemption Examination at any time during the academic year. This examination will be given twice each semester, at registration and at pre-registration. A student may take the Exemption Examination as often as he or she wishes to do so.

If a student does not achieve exemption from the Basic Math Skills requirement through examination, he or she must pass one of the following MATH courses in order to fulfill the Basic Math Skills requirement: 011, 012, 102, 102A, 104, or 104A. It may be necessary for a student to take other courses (e.g., prerequisites) to prepare for these courses. [Note: Basic Math Skills courses numbered below 100 fulfill the requirement, but do not earn graduation credit.]

The Basic Math Skills Exemption Examination consists of the non-trigonometry part of the Mathematics Placement test augmented by Part II of the mathematics Test SK/1A prepared by the Mathematics Association of America (MAA). It is the responsibility of the Department of Mathematics and Statistics to prepare problems which are equivalent to those on the MAA test when such changes are necessary to provide variation from one year to the next.

Analytic Reasoning

In addition to the demonstration of basic competence, the University requires one course in mathematical, quantitative, numerical, analytical, or formal reasoning.
The General Education Council, at its last meeting of the Spring 1995 semester, voted to recommend a change in the language of the General Education requirements concerning the basic math skills exemption exam (Sen.Doc. 85-024 as amended). The Council believes that doing so will (1) allow the department of Mathematics and Statistics to develop an exemption examination which is more compatible with the goals of the General Education Program in basic math skills, rather than one based on preparation for calculus; and (2) bring the language of the document concerning the basic math exemption exam more in line with the language concerning the exemption exam for the writing requirement, which rests responsibility for developing the exam with the Writing Program, within general principles.

The current language of the Basic Math Skills requirement is attached, from page 10 of the booklet describing the General Education Requirements (9/1/94). The Council proposes that the following language be substituted for those three paragraphs:

Students may satisfy the Basic Math Skills requirement by one of the following methods: (1) achieving an appropriate score on the Mathematics Placement Test that is given to all entering students; (2) passing a mathematics course designated as R1; or (3) achieving an appropriate score on the Basic Mathematics Skills Exemption Examination.

The Exemption Examination will be given at least twice each semester, at registration and at pre-registration. A student may take the Exemption Examination as often as he or she wishes to do so. The Basic Math Skills Exemption Examination will be designed, interpreted and administered by the Department of Mathematics and Statistics, subject to periodic review by the General Education Council of the Faculty Senate. Its purpose will be to test for competency in basic skills in quantitative and analytic reasoning as defined above.

Also attached is the proposal and rationale from the Department of Mathematics and Statistics, which was considered by the Council.

MOVED: That the Faculty Senate approve the changes concerning the Basic Mathematics Skills Requirement of the General Education program, as recommended by the General Education Council.
A PROPOSAL TO MODIFY THE BASIC MATH SKILLS EXEMPTION EXAMINATION

From the Department of Mathematics and Statistics

1. Background. Here is in part the current statement of the Basic Math Skills requirement.

"A general education program should provide all students with some enhanced capacity for analytic reasoning. Increasingly, the world is full of numerical information that every educated person must learn to process, evaluate and understand. Without certain basic skills in quantitative and analytic reasoning, full participation in modern society is difficult; indeed, an adequate appreciation of the information content of a daily newspaper often requires certain numeracy skills."

"To ensure that all students possess these skills, two levels of this requirement must be fulfilled: (1) the demonstration of basic competence in college level mathematics; and (2) one course in analytical, formal, mathematical, quantitative, or numerical reasoning."

Students may satisfy the above requirement in a number of ways:

(1) By achieving an appropriate score on a Placement Test that is given to all entering students.
(2) By passing a MATH course designated as R1.
(3) By taking the Basic Mathematics Skills Exemption Examination, and obtaining a score of at least 20 right of the 42 questions on the examination.

We herewith state the provisions of the General Education requirements that pertain to the Exemption Examination.

"This examination will be given twice each semester, at registration and at pre-registration. A student may take the Exemption Examination as often as he or she wishes to do so."

... "The Basic Math Skills Examination consists of the non-trigonometry part of the Mathematics Placement test augmented by Part II of the mathematics Test SK/1A prepared by the Mathematics Association of America (MAA). It is the responsibility of the Department of Mathematics and Statistics to prepare problems which are equivalent to those on the MAA test when such changes are necessary to provide variation from one year to the next."

Thus the provisions of the current requirements completely define the Exemption Test. It consists of 42 questions, 30 of which involve skills that relate to precalculus competency, with the remaining 12 questions more in line with the Basic Math Skills requirement as it is currently stated in the General Education Requirements.
The Department of Mathematics and Statistics believes that the exemption test should not be based on precalculus skills, but should instead have as its basis the type of mathematical skills that are described in the statement of the Basic Math Skills requirement. We further believe that this test can be effective with only 20 questions as opposed to the current 42 questions, and that the exact nature of the examination should rest with the Department of Mathematics and Statistics, and not be totally specified by the General Education regulations.

To this end, we added 8 questions that test basic math skills to the current examination, and administered this expanded examination in March just before the end of the drop period, and again in April just prior to the registration period. The actual exemptions were granted to those students who got 20 or more correct on the 42 questions that comprise the current exemption test. But we compared these scores with the scores that would have been achieved by students had they taken an examination based on the 12 questions from the MAA SK/1A Test and the 8 questions we added to the examination. We believe that this new 20 question examination is entirely in the spirit of the Basic Math Skills requirement, and does an effective job of establishing competency in this area. The students tended to solve a higher percentage of the problems on the revised examination than they did on the original one. For this reason, we feel that competency can be interpreted as achieving a score of 12 right out of 20 questions. At this 60% level, essentially the same set of students would have achieved exemption.

For your convenience, scatter plots are included which demonstrate the connection between the old and new scores. When you examine these scatter plots, you should note that almost no student would have been adversely affected by the proposed examination, and that there appears to be a high correlation between scores on the two versions. The proposed examination tests for what we believe is the intent of the Basic Math Skills requirement, whereas the present exam tests more for whether a student is prepared to take a calculus course.

2. The Proposal. We propose that the two paragraphs we quoted from the General Education requirements be modified to read as follows:

“This examination will be given at least twice each semester, at registration and at pre-registration. A student may take the Exemption Examination as often as he or she wishes to do so.”

“The Basic Math Skills Examination will be designed, interpreted and administered by the Department of Mathematics and Statistics, subject to periodic review by the General Education Council of the Faculty Senate. Its purpose will be to test for competency in basic skills in quantitative and analytic reasoning as described in the first two paragraphs of the description of the Basic Math Skills and Analytic Reasoning requirements.”