

## GENERAL EDUCATION MATHEMATICS REQUIREMENT IN MARYLAND

Approved unanimously by the Higher Education Statewide Mathematics Group, October 25, 2002

### PREAMBLE:

During the 21st century our nation will depend on an ever stronger mathematical competence among its citizenry if our nation is to compete successfully in the increasingly technologically sophisticated global world. Students in courses in physical science, biological science, social science, engineering and architecture are required to have a facility with no less sophisticated mathematics than calculus and probability. Moreover, lawyers, social workers, business managers and executives, and medical professionals, among others, increasingly need to be able to interpret data, think logically and deductively, have a sense of numbers that make sense in various contexts, and apply algebra where appropriate. These are some of the qualities of what is often called quantitative literacy, and they apply to everyday living, such as in estimating a tip at a restaurant or evaluating credit card rates. Thus a major goal of mathematics training is to prepare students for success in other disciplines, as well as in mathematics and in everyday life.

It follows that mathematics serves as a foundation for a student's future as an educated person and a person in the workforce. Although some entering college students have such a mathematical maturity, many don't, and it remains for them to obtain it in college. In fact, the real achievement of general education mathematical literacy should not be expected to be achieved merely by one college mathematics course. It comes only from the general education curriculum at the college level. Moreover, with the broadening use of, and reliance on, quantitative methods in all kinds of subjects, it is increasingly critical that faculty across all of the disciplines be encouraged to use mathematics and statistics and data analysis in their courses when appropriate. One cannot expect students to achieve mathematical maturity unless they are constantly called on to use the mathematics that they have learned.

There are many diverse college mathematics courses that can provide mathematical maturity and literacy. Among them are college algebra, statistics, mathematical modeling (also called finite mathematics), and "liberal arts" mathematics. However, these courses can only be considered as appropriate for college credit if they are of college caliber. Both 2-year college and 4-year mathematics faculty in Maryland's public higher education institutions agree that credit bearing college mathematics courses need to have as prerequisite the equivalent of college Intermediate Algebra or the traditional high school Algebra II. This is also in keeping with General Education Mathematics definitions in other states such as Missouri. Thus the minimum state high school graduation requirement in mathematics of 3 units (including one in algebra and one in geometry) does not suffice as adequate preparation for any General Education Mathematics course in a Maryland public higher education institution.

### ATTRIBUTES:

Upon successful completion of such a course, which needs to have as a prerequisite a level of mathematical maturity including Intermediate Algebra (in college) or the traditional Algebra II (in high school), the student should be able to:

- (1) interpret mathematical models given verbally, or by formulas, graphs, tables, or schematics, and draw inferences from them,
- (2) represent mathematical concepts verbally, and where appropriate, symbolically, visually, and numerically,
- (3) use arithmetic, algebraic, geometric, technological, or statistical methods to solve problems,
- (4) use mathematical reasoning with appropriate technology to solve problems, test conjectures, judge the validity of arguments, formulate valid arguments, and communicate the reasoning and the results,
- (5) estimate and check answers to mathematical problems in order to determine reasonableness,
- (6) recognize and use connections within mathematics and between mathematics and other disciplines.