Standards for Intellectual Development

Crossroads in Mathematics (AMATYC, 1995, p. 10-12)

Standard I-1 Problem Solving

Students will engage in substantial problem solving.

Standard I-2 Modeling

Students will learn mathematics through modeling real-world situations.

Standard I-3 Reasoning

Students will expand their mathematical reasoning skills as they develop convincing mathematical arguments.

Standard I-4 Connecting With Other Disciplines

Students will develop the view that mathematics is a growing discipline, interrelated with human culture, and understand its connections to other disciplines.

Standard I-5 Communicating

Students will acquire the ability to read, write, listen to, and speak mathematics.

Standard I-6 Using Technology

Students will use appropriate technology to enhance their mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of their results.

Standard I-7 Developing Mathematical Power

Students will engage in rich experiences that encourage independent, nontrivial exploration in mathematics, develop and reinforce tenacity and confidence in their abilities to use mathematics, and inspire them to pursue the study of mathematics and related disciplines.

Standards for Content

Standard C-1 Number Sense

Students will perform arithmetic operations, as well as reason and draw conclusions from numerical information.

Standard C-2 Symbolism and Algebra

Students will translate problem situations into their symbolic representations and use those representations to solve problems.

Standard C-3 Geometry

Students will develop a spatial and measurement sense.

Standard C-4 Function

Students will demonstrate understanding of the concept of function by several means (verbally, numerically, graphically, and symbolically) and incorporate it as a central theme into their use of mathematics.

Standard C-5 Discrete Mathematics

Students will use discrete mathematical algorithms and develop combinatorial abilities in order to solve problems of finite character and enumerate sets without direct counting.

Standard C-6 Probability and Statistics

Students will analyze data and use probability and statistical models to make inferences about real-world situations.

Standard C-7 Deductive Proof

Students will appreciate the deductive nature of mathematics as an identifying characteristic of the discipline, recognize the roles of definitions, axioms, and theorems, and identify and construct valid deductive arguments.

Standards for Pedagogy

Standard P-1 Teaching and Technology

Mathematics faculty will model the use of appropriate technology in the teaching of mathematics so that students can benefit from the opportunities it presents as a medium of instruction.

Standard P-2 Interactive and Collaborative Learning

Mathematics faculty will foster interactive learning through student writing, reading, speaking, and collaborative activities so that students can learn to work effectively in groups and communicate about mathematics both orally and in writing.

Standard P-3 Connecting with Other Experiences

Mathematics faculty will actively involve students in meaningful mathematics problems that build upon their experiences, focus on broad mathematical themes, and build connections within branches of mathematics and between mathematics and other disciplines so that students will view mathematics as a connected whole relevant to their lives.

Standard P-4 Multiple Approaches

Mathematics faculty will model the use of multiple approaches—numerical, graphical, symbolic, and verbal—to help students learn a variety of techniques for solving problems.

Standard P-5 Experiencing Mathematics

Mathematics faculty will provide learning activities, including projects and apprenticeships, that promote independent thinking and require sustained effort and time so that students will have the confidence to access and use needed mathematics and other technical information independently, to form conjectures from an array of specific examples, and to draw conclusions from general principles.

<u>*Standards for Implementation*</u>
Beyond Crossroads in Mathematics (AMATYC, 2006, p. 13-14)

Implementation Standard: Student Learning and the Learning Environment
Mathematics faculty and their institutions will create an environment that optimizes the learning of mathematics for all students.

Implementation Standard: Assessment of Student Learning
Mathematics faculty will use the results from the ongoing assessment of student learning of mathematics to improve curricula, materials, and teaching methods.

Implementation Standard: Curriculum and Program Development
Mathematics departments will develop, implement, evaluate, assess, and revise courses, course sequences, and programs to enable students to attain a higher level of quantitative literacy and achieve their academic and career goals.

Implementation Standard: Instruction
Mathematics faculty will use a variety of instructional strategies that reflect the results of research to enhance student learning.

Implementation Standard: Professionalism
Institutions will hire qualified mathematics faculty, and these faculty will engage in ongoing professional development and service.

References

American Mathematical Association of Two-Year Colleges. (1995). *Crossroads in mathematics: Standards for introductory college mathematics before calculus.* Cohen, D. (Ed.). Memphis, TN: Author.

American Mathematical Association of Two-Year Colleges. (2006). *Beyond crossroads: Implementing mathematics standards in the first two years of college.* Blair, R. (Ed.). Memphis, TN: Author.