

Senior High School Mathematics Programs

**Revised
Handbook for Parents and Students
2003–2004**

September 2003

Alberta
LEARNING

SENIOR HIGH SCHOOL MATHEMATICS PROGRAMS

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Introduction

Mathematics continues to be an important part of students' programs and essential for their success in post-secondary and throughout their careers. The programs were designed to help students develop skills to solve a wide range of problems both inside and outside of mathematics courses, and to keep pace with the latest information technology.

Differences between Applied Mathematics and Pure Mathematics

The main differences between Applied Mathematics and Pure Mathematics are the topics studied, and the approach to solving problems and developing understanding. Both programs help students develop the critical skill of using mathematics to find solutions to problems involving real-life situations. Students planning to pursue programs requiring the study of mathematics at the post-secondary level should be registered in Pure Mathematics.

Applied Mathematics

Applied Mathematics courses focus on the application of mathematics in problem solving. Through challenging and interesting activities and projects, students further develop their skills in mathematical operations and in understanding concepts. Students in Applied Mathematics construct graphs, scale diagrams and tables, and use computers and spreadsheet programs to perform long and complex mathematical calculations. Graphing and spreadsheet activities provide opportunities for students to develop competency in algebra while solving problems relevant to today's world. **Applied Mathematics 30 has limited acceptance for university programs.**

Pure Mathematics

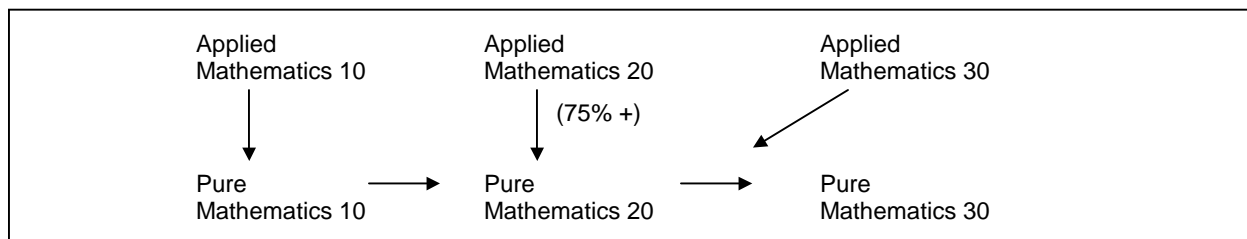
Pure Mathematics courses emphasize the specialized language of algebra as the preferred method for learning mathematical concepts and for solving problems. Students learn about mathematical theories, find exact value solutions to equations, and use formal mathematical reasoning and models in problem solving.

Students in both Applied Mathematics and Pure Mathematics programs are expected to graph and solve algebraic equations, and to solve problems in trigonometry, finance, statistics and probability. In both programs, students use the graphing calculator to visualize and identify patterns and relationships in algebraic equations.

Transferring between Pure Mathematics and Applied Mathematics

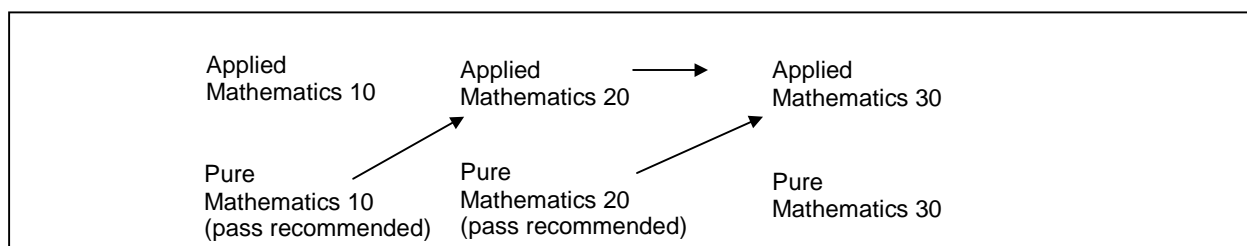
Applied Mathematics to Pure Mathematics

Students who pass Applied Mathematics 10 can transfer to Pure Mathematics 10. Students who pass Applied Mathematics 20 may also transfer to Pure Mathematics 20. (It is advisable that students should have a mark of 75 per cent or better.) Students cannot transfer between Applied Mathematics 30 and Pure Mathematics 30.



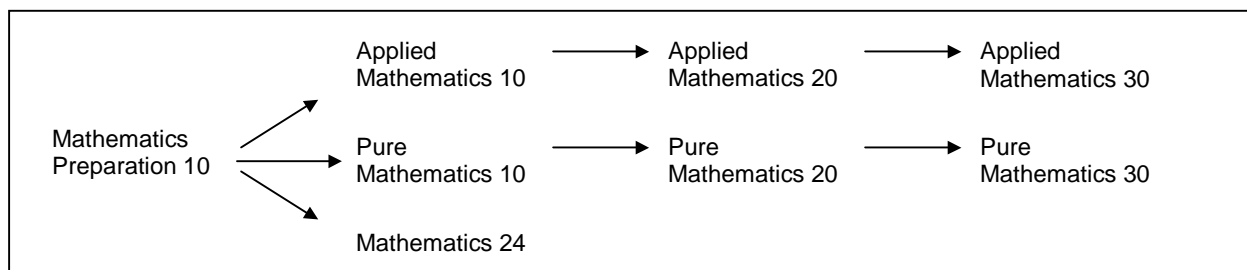
Pure Mathematics to Applied Mathematics

Students who pass Pure Mathematics can transfer to the Applied Mathematics program sequence at the next level. For example, students who pass Pure Mathematics 10 can transfer to Applied Mathematics 20.



Mathematics Preparation 10

Students who pass Mathematics Preparation 10 have the option to enter into Applied Mathematics 10, Pure Mathematics 10 or Mathematics 24.



Transitional Mathematics 101

Transitional Mathematics 101 is offered to students who have completed Applied Mathematics 30 and wish to enter post-secondary programs that require Pure Mathematics 30. This post-secondary course provides students with knowledge and skills in lieu of Pure Mathematics 30, and will be offered through Athabasca University and other post-secondary institutions. For more information about this course, refer to the document *Frequently Asked Questions About Transitional Mathematics 101*, available through the mathematics section of the Alberta Learning Web site at www.learning.gov.ab.ca/k_12/curriculum/bySubject/math/whatsnew/Faq.asp.

Calculator Policy for Mathematics

To ensure compatibility with the curriculum, and equity and fairness to all students, Alberta Learning expects students to use calculators in their day-to-day studies as well as when writing diploma examinations in mathematics and the sciences.

In 1996 Alberta Learning informed schools that the two new senior high school programs, Applied Mathematics 10–20–30 and Pure Mathematics 10–20–30, would require graphing calculators. School authorities are required to have calculators or other suitable technology available for students. School authorities are required to ensure that students taking Pure Mathematics 30 or Applied Mathematics 30 have access to an approved graphing calculator for diploma examinations.

Student Assessment

Teachers from across Alberta helped prepare standards for Applied Mathematics and Pure Mathematics to ensure that the courses are at an appropriate level of difficulty. The standards provide a basis for fair and equitable assessment of students in all senior high schools. Standards for the grades 10, 11 and 12 Applied Mathematics and Pure Mathematics courses were made available to schools in September 2000.

One of the written response questions on the Applied Mathematics 30 and the Pure Mathematics 30 Diploma Examinations will be related to specific projects, which have been distributed to schools. Diploma examinations for Applied Mathematics 30 and Pure Mathematics 30 are weighted at 50 per cent.

Post-secondary Options

Pure Mathematics

Pure Mathematics is accepted for entrance at all post-secondary institutions. It was designed as a pre-calculus course to prepare students for post-secondary programs that require studies in mathematics; e.g., all science, engineering and mathematics-related programs. A student who is planning to take calculus courses in post-secondary education will need to take Pure Mathematics 30 and possibly also Mathematics 31. Some areas of post-secondary study, such as commerce, engineering, physics and engineering technologies, require or recommend both of these courses for entrance.

Applied Mathematics

Applied Mathematics is accepted at many post-secondary institutions; however, for particular programs, Pure Mathematics is either required or preferred. Applied Mathematics was designed as an alternative approach to learning mathematics that could prepare students for post-secondary programs that do not require a calculus course; e.g., many two-year certificate and diploma programs at regional colleges and technical schools, and some arts and fine arts programs at universities.

Post-secondary Acceptance

For information regarding what post-secondary institutions require for prerequisites, refer to the document *The New Senior High School Mathematics Program and Post-secondary Studies*, available through the mathematics section of the Alberta Learning Web site at http://www.learning.gov.ab.ca/k_12/curriculum/bySubject/math/postup.asp.

Universities

Students with Pure Mathematics can gain entrance to all university programs. Students with Applied Mathematics 30 can gain admission to some university programs; however, their ability to change programs after admission may be limited. Students with Applied Mathematics and a 30-level second language can gain admission to some arts and fine arts programs. Students contemplating a mathematics- or science-based university degree program are advised to enroll in the Pure Mathematics sequence.

Private University Colleges

Private university colleges offer accredited degree programs. Admission requirements vary by program. Generally, Pure Mathematics 30 is accepted for admission into all programs. Applied Mathematics 30 is accepted for selected Bachelor of Arts programs at Canadian University College and Concordia University College and as a fifth subject at Augustana University College. It is not accepted at King's University College.

Public Colleges

There are approximately 15 publicly-funded institutions in this category offering a wide array of diploma and certificate programs. Applied Mathematics or Pure Mathematics is accepted for the vast majority of these programs. Admission requirements for **university transfer** programs at a college are similar to requirements for entrance into the related degree program at a university.

Technical Institutes

The two technical institutes in Alberta offer a spectrum of diploma and certificate programs, ranging from engineering technology programs that require rigorous mathematics and science prerequisites, to apprenticeship and trade programs that require Grade 10- or Grade 11-equivalent mathematics.

- NAIT—The majority of programs accept Applied Mathematics or Pure Mathematics for admission. For specific programs, particularly Engineering Technology programs, students require Pure Mathematics 30.
- SAIT—The majority of programs accept Applied Mathematics or Pure Mathematics; however, the selection process will weigh Pure Mathematics higher than Applied Mathematics.

For More Information

For more information about the new mathematics programs, visit the Alberta Learning Web site at www.learning.gov.ab.ca/k_12/curriculum/bySubject/math, or contact the Curriculum Branch at 780-427-2984, fax 780-422-3745. To be connected toll free inside Alberta, dial 310-0000.