



## Discussion Paper on Post-secondary Acceptance of the New Common Curriculum Framework

*The purpose of this document is to provide some context for discussions of post-secondary acceptance of the new 10 to 12 mathematics pathways. The goal of the BCAMT, as part of our general mission to promote excellence in mathematics education in BC, is to foster productive working relationships with all stakeholders. We hope this document can help our members and others discuss post-secondary acceptance from an informed standpoint.*

In a situation where high school students have a choice of mathematics courses available to meet graduation requirements, a major influence on their course selection is always the admissions requirements of post-secondary institutions. Post-secondary acceptance of one of these course options therefore impacts the success of implementing a new curriculum. Indeed, the limited acceptance of the Applications mathematics pathway in the most recent curriculum (2000) made it very difficult to promote that course to students on its own merits, and resulted in a situation where a course designed for half or more of students ended up being taken by fewer than fifteen percent of them. The other pathways (Principles and Essentials) then ended up with more students in them than the courses were designed for, which impacted how they were delivered.

In response to these acceptance issues, the Western and Northern Canadian Protocol, which builds the Common Curriculum Framework (CCF) for the Western provinces and the territories, decided to survey the post-secondary institutions, asking more directly which specific math outcomes would ensure student success in each post-secondary program. The result of this consultation was a seventy-six page report on findings, which outlined a three-pathway structure to meet the requirements as requested for students entering one of three post-secondary paths: direct entry to the workforce or some apprenticeships, entrance to university programs which involve the study of calculus, and entrance to all other post-secondary programs. From these findings, the WNCP designed a three-pathway mathematics curriculum, with the express intent of aligning the courses with specific types of post-secondary career or study paths. These three pathways represent different courses from the current three-pathway curriculum, and in particular have less overlap than some of the courses had previously. Even the names of the new pathways clearly imply intended career or study paths.

Given the express intent of this pathway structure, arising as it does from direct consultation with representatives of post-secondary stakeholders, it is disappointing to hear of post-secondary institutions choosing Pre-calculus 11 as a prerequisite for entry into non-calculus based programs. Allowing Foundations 12 as an alternate does little to assuage this disappointment, given that our graduation program requires only a grade 11 mathematics course. Students are far less likely to choose a course-load of two senior math courses when one course would meet both their graduation and university entrance requirements. Moreover, the outcomes of Foundations 12 and Pre-calculus 11 are almost entirely dissimilar, so equating them as prerequisites suggests the content itself is not the determining factor.

Although course outcomes are often central in decisions regarding entrance requirements, sometimes stakeholders point to reasoning skills that courses develop when choosing one course over another. Indeed, the BC Committee on Undergraduate Programs in Mathematics and Statistics (BCcupms) published the Mathematics Proficiencies Project in 1999 which points out that, notwithstanding the importance of some specific proficiencies (outcomes) for particular courses, the general proficiencies -- including such things as problem-solving, synthesizing,

modeling, and having positive attitudes towards math -- are paramount. In this respect, too, the new curriculum is designed intentionally to meet this broader, more fundamental requirement. The new 10 to 12 CCF, in keeping with the curriculum from K to 9, strongly emphasizes in all three pathways teaching and learning mathematics through the mathematics processes, which are another way of classifying the general proficiencies listed in the BCcupms report. All three pathways are designed to develop these proficiencies as applied to different topics, depending on career or study paths. Accepting one course over another based on these requirements, then, does not accord with the design of the curriculum.

We are in a situation where students have to choose a mathematics course at grade 11 as a graduation requirement. If a university were to set a grade 11 math course as a general admission requirement, our understanding of the curriculum suggests that either Foundations 11 or Pre-calculus 11 should suffice. A graduate with equivalent performance in either of these courses should bring the general proficiencies as indicated above, but with specific proficiencies that would be suitable for a different range of post-secondary studies. For specific programs, of course, either of the grade 12 level courses may be appropriate pre-requisites, depending on required content knowledge, but some programs may require only the content of a grade 11 course. Students who choose a math pathway based on interest and a matching post-secondary career or study path are far more likely to experience success and to develop the general proficiencies than would students who choose a course in which they may have less interest but that they perceive would keep more doors open.

Ultimately, the issues raised here point to the larger questions of what success in mathematics looks like and what it means to be well-prepared in mathematics. The implementation of a new curriculum provides an excellent opportunity for all stakeholders to collaboratively discuss these larger questions.