Mathematics Credentials and Integrated Mathematics

Please see the information below, which has been copied and pasted from emails to and from the Commission on Teacher Credentialing, which was forwarded to me, Emily Oliva, Education Programs Consultant, on April 22, 2013.

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1) Can teachers with a Foundational level credential teach Integrated One (a course with content more advanced than geometry)?

Based on an analysis of the California Department of Education CBEDS course assignment code definitions below (http://www.cde.ca.gov/ds/dc/cb/subjects.asp#m) for Integrated Mathematics I and II, the holder of a Single Subject Teaching Credential in the broad content area of Foundational-Level Mathematics would be authorized. The Foundational-Level Math (FLM) authorizes the holder to teach the following content areas: general mathematics, **all levels of algebra**, geometry, probability and statistics, and consumer mathematics. Calculus and math analysis classes are outside the scope of the authorization. The Foundational-Level Math content area does not include grade level restrictions but instead authorizes the content noted above in preschool, grades K-12 and in classes organized primarily for adults.

Trigonometry is **not included** in the authorization for FLM. If the content of a pre-calculus (or any other math) class has a significant focus in trigonometry, the FLM credential does not authorize such an assignment. It is important to note that math is a progressively structured academic discipline and it is likely that some introduction to trigonometry might occur at the end of an algebra or geometry class. This introduction of trigonometry in an algebra or geometry class is authorized by the FLM credential. An introduction to the next progression area of math does not require an authorization in the introduced area of math.
In contrast, there are also supplementary and subject matter authorizations in Introductory Mathematics that could be added to a Single Subject Teaching Credential. Both Supplements and Subject Matter Authorizations in Introductory Mathematics allow teaching subject matter content ***typically*** included in curriculum guidelines and textbooks for ***study in grades 9 and below*** but the students may be in grades K-12. The determination of the curriculum content level is in part a local level determination that is based on the K-12 content standards. The authorization statement for a supplementary authorization in mathematics added to a Multiple Subject Credential limits teaching mathematics to students in grades 9 and below specifically. The content area is not constrained but they may not teach the content area of math to any student above grade 9 regardless of math level.

2425 Integrated Mathematics I (college preparatory)
Integrated Mathematics Course I is the first of three mathematics courses required for college entrance. The course content includes: functions; algebra; geometry; statistics; probability; discrete mathematics; measurement; number; logic; and language. The course emphasizes mathematical reasoning, problem solving, and communication through integration of the various strands, connections with other subject areas and real-life applications, use of technology, and exploratory and group activities. The course emphasizes algebra.

2426 Integrated Mathematics II (college preparatory)
Integrated Mathematics Course II is the second of three mathematics courses required for college entrance. The course content expands upon the mathematical content and techniques of Integrated Mathematics Course I. In addition to further development of the strands with connections and applications, this course emphasizes unifying ideas such as mathematical modeling and argumentation, variation, algorithmic thinking, and multiple representations. The course emphasizes geometry.

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2427 Integrated Mathematics Course III (college preparatory)
Integrated Mathematics Course III is the third of three mathematics courses required for college entrance. The course content expands upon the mathematical content and techniques of Course II. Connections among the strands and unifying ideas continue with attention given to depth of understanding. Students successfully completing Course III are prepared for pre-calculus or alternative mathematics courses that emphasize real-world applications in the social sciences, or life and physical sciences. The course emphasizes advanced algebra and trigonometry.

2430 Integrated Mathematics IV (college preparatory)
The Integrated Mathematics Course IV is for programs that cover the Integrated Mathematics subjects in four years, instead of three years. The course emphasizes advanced geometry, advanced algebra, and probability and statistics.

2) Can teachers with a Supplementary Authorization teach Integrated Mathematics I?

In part, the response to this question is based on a local level determination. It is our understanding in working with CDE that while there are suggested model pathways, specific math content under common core at the secondary level remains non-grade specific and could be taught in a range of grades from 7-12. Therefore, even though there are documents that suggest model pathways, the actual *planned course of study* remains a **local level decision**. The holder of a supplementary authorization in mathematics when added to a Single Subject/Secondary Teaching Credential would be authorized to teach Integrated Mathematics I if the local level determined that the course was the typical planned course of study for students in grades 9 and below in their district.
There are different authorization statements depending on whether the supplementary authorization (20 semester units/10 upper division or graduate) is noted on a Multiple Subject/elementary credential or a Single Subject/secondary credential. Information is also included below related to the Subject Matter Authorizations (32 semester units) just to cover all of the bases but the Commission had an agenda item in 2009 on Math Authorizations that also addresses this information in more detail - http://www.ctc.ca.gov/commission/agendas/2009-01/2009-01-3E.pdf. Our various mathematics authorizations may include limitations based on curriculum content level, grade level, and specific math content.

Both types of *supplementary authorizations* in math provided below require a minimum of 20 semester units (10 upper division/graduate) across the following content areas (introduction to math/development of the real number system, algebra, geometry and probability or statistics).

The *math supplementary (R1B)* added to single subject teaching credential authorizes the holder to teach students K-12 in the supplementary content as long as it is **typically** included in curriculum guidelines and textbooks for study in grades 9 and below.

The *introductory math supplementary (R2B)* added to a Multiple subject teaching credential authorizes the holder to teach departmentalized classes related to the content of the supplementary authorization to students **specifically in grades 9 and below**. They would not be authorized to teach any students above grade 9 in the departmentalized area of math even if the student were repeating a course or working at a lower level. The curriculum level is not addressed so any math content may be taught as long as the students are in grade 9 and below.

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The *Subject Matter Authorization* (SMAB) requires an individual to complete a minimum of 32 semester units across five content areas (introduction to math/development of the real number system, algebra, advanced algebra, geometry and probability or statistics). The introductory subject matter authorizations limit the holder to teaching the subject matter content **typically** included in curriculum guidelines and textbooks approved for study in grades 9 and below. This allows an employer to assign a teacher with an introductory authorization to teach a class in which the curriculum is for grades 9 and below but the students in the class may be in grades K-12.