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## Information

### *Professional Services Committee*

#### Authorizations for Teaching Mathematics

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**Executive Summary:** This agenda item continues the discussion begun at the October 2008 Commission meeting related to the teaching of mathematics in California. The focus of this item is the authorization statements for documents that authorize the teaching of mathematics.

**Recommended Action:** For information only

**Presenter:** Teri Clark, Administrator,  
Professional Services Division

#### Strategic Plan Goal: 1

#### Promote educational excellence through the preparation and certification of professional educators

- ◆ Sustain high quality standards for the preparation and performance of professional educators and for the accreditation of credential programs

January 2009

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## Authorizations for Teaching Mathematics

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### Introduction

The Commission began a discussion at its October 2008 meeting related to the preparation of individuals who teach mathematics (<http://www.ctc.ca.gov/commission/agendas/2008-10/2008-10-2D.pdf>). At the November 2008 Commission meeting (<http://www.ctc.ca.gov/commission/agendas/2008-11/2008-11-2G.pdf>) staff presented a plan for addressing the issues related to the authorizations to teach mathematics in California’s public schools. The December 2008 item focused on the Mathematics Specialist Credential. This item provides a detailed overview of the authorizations that allow an individual to teach mathematics.

### Background

There are a number of authorizations for the teaching of mathematics in California’s public schools. These authorizations and the mathematics subject matter knowledge required for them are presented in Table 1 below.

**Table 1: Authorizations to Teach Mathematics**

	<b>Credential Type</b>	<b>Authorized Assignments</b>	<b>Grade Levels/ Settings</b>	<b>Subject Matter Preparation Required</b>
<b>Basic Teaching Credentials</b>				
A	Multiple Subject Credential (Includes Interns)	Math content grades 12 and below	Math in Self-Contained Classrooms or Core Settings <sup>1/</sup>	Passage of CSET: Multiple Subjects  Examination subject matter requirements are aligned to the K-7 academic content standards in mathematics.  NCLB Compliant.
B	Single Subject Credential in Mathematics (Includes Interns)	All mathematics courses	Departmentalized Classrooms—all Grade Levels	Passage of CSET: Mathematics (3 Sections) or completion of an approved subject matter program.  Examination or program subject matter requirements are aligned to the 8-12 grade academic content standards in mathematics.  NCLB Compliant.

**Table 1: Authorizations to Teach Mathematics**

	<b>Credential Type</b>	<b>Authorized Assignments</b>	<b>Grade Levels/ Settings</b>	<b>Subject Matter Preparation Required</b>
C	Single Subject Credential in Foundational-Level Mathematics (Includes Interns)	General Math, Consumer Math, Algebra, Geometry Probability and Statistics	Departmentalized Classrooms—all Grade Levels	Passage of CSET Foundational Mathematics (2 Sections) or completion of an approved foundational-level mathematics subject matter program.  Examination or program subject matter requirements are aligned to the Algebra, Geometry, and Probability and Statistics academic content standards in mathematics.  NCLB Compliant.
<b>Authorizations That Can Be Added to a Basic Teaching Credential</b>				
D	Subject Matter Authorization in Mathematics	Math content grades 9 and below	Departmentalized Classrooms—all Grade Levels	Completion of 32 semester units in specific areas of mathematics.  NCLB Compliant.
E 1	Supplementary Authorization in (Introductory) Mathematics added to Elementary Credential	Students grades 9 and below	Departmentalized Classrooms—Grades 9 and below	Completion of 10 upper division or 20 semester units in specific areas of mathematics.  <u>Not</u> NCLB Compliant.
E 2	Supplementary Authorization in (Introductory) Mathematics added to Secondary Credential	Math content grades 9 and below	Departmentalized Classrooms—all Grade Levels	Completion of 10 upper division or 20 semester units in specific areas of mathematics.  <u>Not</u> NCLB Compliant.
<b>Temporary Authorizations Requested by Employer</b>				
F	Short-Term Staff Permit in Mathematics	All mathematics courses	Departmentalized Classrooms—all Grade Levels	Satisfaction of subject matter requirement as in Row B or C above, or 9 upper division or 18 semester units in math. Issued once for one year at employer request.  <u>Not</u> NCLB Compliant.

**Table 1: Authorizations to Teach Mathematics**

	<b>Credential Type</b>	<b>Authorized Assignments</b>	<b>Grade Levels/ Settings</b>	<b>Subject Matter Preparation Required</b>
G	Provisional Intern Permit in Mathematics	All mathematics courses	Departmentalized Classrooms—all Grade Levels	Initially 9 upper division or 18 semester units in math. Issued one-year at employer request. Must take appropriate subject matter exams for a one time one-year reissuance. <u>Not NCLB Compliant.</u>
H	Local Teaching Assignment Option (LTAO) in Mathematics	All mathematic courses	Departmentalized Classrooms—all Grade Levels	Various subject matter requirements. Available only for fully credentialed teachers. Is a local level employment option with approval by local governing board on a year-to-year basis. <u>Not NCLB Compliant.</u>
I	Single Subject Limited Assignment Permit in Mathematics	All mathematics courses	Departmentalized Classrooms—all Grade Levels	Available only for fully credentialed teachers. May only be issued for three one-year terms in a specific subject area. Six semester units of coursework in the subject area are required for each one-year reissuance. <u>Not NCLB Compliant.</u>

<sup>1/</sup> A Core setting is when two or more subjects are taught to the same group of students, in grades 5-8 –Algebra 1 may be included as one of those subjects.

### **Relationship of Authorizations to the K-12 Academic Content Standards for Mathematics**

The academic content standards in mathematics (<http://www.cde.ca.gov/be/st/ss/documents/mathstandard.pdf>) were adopted by the State Board of Education (SBE) in December 1997. As stated in the mathematics standards document, “The standards identify what all students in California public schools should know and be able to do at each grade level.”

For grades K-7, the standards are organized into the five strands listed below and the content builds throughout the eight grades:

- Number Sense
- Algebra and Functions
- Measurement and Geometry
- Statistics, Data Analysis, and Probability
- Mathematical Reasoning

The content standards for grades eight through twelve are organized differently from those for K-7. As the standards documents explains, "...mathematics studied in grades eight through twelve fall naturally under the discipline headings algebra, geometry, and so forth. Many schools teach this material in traditional courses; others teach it in an integrated program." The content standards document provides a table reprinted below that "...reflects typical grade-level groupings of these disciplines in both integrated and traditional curricula. The lightly shaded region reflects the minimum requirement for mastery by all students. The dark shaded region depicts content that is typically considered elective but that should also be mastered by students who complete the other disciplines in the lower grade levels and continue the study of mathematics."

**Table 2: Mathematics Disciplines, by Grade Level**

Discipline	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Algebra I					
Geometry					
Algebra II					
Probability and Statistics					
Trigonometry					
Linear Algebra					
Mathematical Analysis					
Advanced Probability and Statistics					
Calculus					

<http://www.cde.ca.gov/be/st/ss/documents/mathstandard.pdf>, page 36

The authorizations that allow an individual to teach mathematics prescribe the courses that credential holders may teach. In grades K-7, the mathematics taught is based primarily on the state-adopted K-7 academic content standards. In grades 8 and above, mathematics courses are based primarily on the state-adopted student academic content standards for the specific mathematics disciplines of Algebra, Geometry, Trigonometry, and others (see Table 2 above). While there are grade-level student academic content standards in mathematics for grades 7 and below, there are no grade-level student academic content standards in mathematics for grades 8 and above. This context makes determining the requisite mathematics content background for the Multiple Subject credential authorization more complex when it comes to teachers of mathematics in grade 8. Within the student academic content standards, Algebra is presented as a separate subject that may be taught to students in any of grades 8-12. It is clear that teachers of Algebra in grades above ninth grade must hold the Single Subject credential. However, currently, a number of authorizations, including a Multiple Subject teaching credential are defined as appropriate for individuals in teaching assignments which include teaching Algebra in a core setting in grades 8 or any math class in a self contained K-12 classroom.

It should be noted, however, that the various student academic content standards documents reflect different grade level organizations of the topics covered. For example, while the mathematics standards cover grades K-7 and then separate into the various mathematics disciplines for grades 8-12, other standards such as foreign language may incorporate grades 7-12 in their span. This context makes understanding the relationship of the K-12 student academic

content standards to the Commission-adopted subject matter requirements which form the basis for both programs and exams more complex.

### **Detailed Description of Credential Authorizations Relative to Mathematics**

#### ***Multiple Subject Authorization***

In the self-contained classroom the teacher usually holds a Multiple Subject teaching credential (Table 1, Row A). The authorization statement for the Multiple Subject teaching credential reads:

This credential authorizes the holder to teach all subjects in a self-contained class and, as a self-contained classroom teacher, to team teach or to regroup students across classrooms, in grades twelve and below, including preschool, and in classes organized primarily for adults. In addition, this credential authorizes the holder to teach core classes consisting of two or more subjects to the same group of students in grades five through eight, and to teach any of the core subjects he or she is teaching to a single group of students in the same grade level as the core for less than fifty percent of his or her work day.

The Multiple Subject teaching credential authorizes an individual to provide instruction in math content usually taught in grades 12 and below in a self-contained classroom or in a core setting. In California's public schools, self-contained classrooms are found primarily in elementary schools. Core settings - where two or more subjects are taught to the same students by the same teacher - are limited to grades 5-8 and are used in many middle schools. Thus, the Multiple Subject teaching credential authorizes an individual to teach both Algebra I and Geometry if the course is part of a core setting or in a self-contained classroom.

Content Preparation: The mathematics subject matter preparation for the Multiple Subject teaching credential is aligned to California's K-12 academic content standards as applicable to grades K-7, and is assessed through the California Subject Examinations for Teachers: Multiple Subjects (CSET:MS). An agenda item to be presented in March 2009 will look more closely at the subject matter preparation and examination requirements for this credential.

#### ***Single Subject and Single Subject-Foundational-Level Authorizations***

In departmentalized mathematics instruction, an individual might hold either a Single Subject Teaching Credential in Mathematics or a Single Subject Teaching Credential in Foundational-Level Mathematics (Table 1, Rows B and C). The Single Subject Teaching Credential in Mathematics authorizes an individual to teach all math courses taught in the public schools up to and including Calculus. The Single Subject Teaching Credential in Foundational-Level Mathematics authorizes an individual to teach all math courses up to and including Algebra II.

Content Preparation: The Single Subject teaching credential in mathematics requires the individual either to pass the CSET: Mathematics examination, which is comprised of three subtests for the full mathematics authorization or two subtests for the Foundational-Level authorization, or to complete an approved subject matter program in mathematics. Both the examination and the approved subject matter program address the adopted Subject Matter Requirements (<http://www.ctc.ca.gov/educator-prep/standards/SSMP-Handbook-Math.pdf>) which are based on the academic content standards adopted by the SBE. Thus, both the subject matter preparation for the Single Subject Mathematics and Single Subject-Foundational Level

Mathematics are aligned to the academic content standards for Grades 8-12 discipline-specific mathematics.

***Subject Matter and Supplementary Authorization in Introductory Mathematics***

An individual who holds a Multiple Subject credential or a Single Subject teaching credential in a subject other than mathematics can add either a Subject Matter Authorization in Mathematics (Table 1, Row D) or a Supplementary Authorization in Introductory Mathematics (Row E-2). Currently both authorizations read:

This credential authorizes the holder to teach only the subject matter content typically included for the introductory subject or subjects listed above, in curriculum guidelines and textbooks approved for study in grades 9 and below to students in preschool, kindergarten, grades 1-12, or in classes organized primarily for adults.

As previously discussed, the mathematics content to be taught in grades 8 and 9 is not clearly specified by grade level but rather by discipline. Four of the nine disciplines listed as appropriate for grades 8-12 by the *Mathematics Content Standards for California Public Schools* (listed on page 4 of this item) are identified as being taught in grades 8 and 9.

Both the Supplementary Authorization in Introductory Mathematics added to a secondary level teaching credential and the Subject Matter Authorization in Mathematics allow an individual to teach the content approved for study in grades 9 and below. These authorizations allow an employer to assign a teacher with the authorization to teach a class in which the curriculum is designed for grades 9 and below, although the students in the class may be in any of grades K-12.

The Supplementary Authorization in Introductory Mathematics added to an elementary teaching credential (Table 1, Row E-1) is similar to the Subject Matter Authorization or the Supplementary Authorization in Introductory Mathematics added to a secondary level teaching credential except the elementary teacher with the supplementary authorization may only teach students in grades 9 and below. With both Algebra I and Geometry identified as appropriate to be taught in an 8<sup>th</sup> grade class, these three documents authorize an individual to teach both Algebra I and Geometry.

Content Preparation: The content requirements vary for the three authorizations—10 upper division or 20 total semester units for the Supplementary Authorization compared to 32 semester units for the Subject Matter Authorization. Table 3 below provides additional detail about the content an individual must have completed prior to applying for the added authorization.

**Table 3: Subject Matter and Supplementary Authorizations in Mathematics**

Authorization	Unit Requirements	Subject Matter Content Requirements
Subject Matter Authorization	32 semester units, including a minimum of three semester	<ul style="list-style-type: none"> <li>• Must include course work in the content areas of               <ul style="list-style-type: none"> <li>- algebra,</li> <li>- advanced algebra,</li> <li>- geometry,</li> <li>- probability or statistics, and</li> </ul> </li> </ul>

**Table 3: Subject Matter and Supplementary Authorizations in Mathematics**

Authorization	Unit Requirements	Subject Matter Content Requirements
	units of course work in each content area	<ul style="list-style-type: none"> <li>- development of the real number system or introduction to mathematics</li> <li>• a grade of “C” or higher is required in every course used to meet this requirement</li> </ul>
Supplementary Authorization in Introductory Mathematics (added to elementary or secondary teaching credential)	20 semester units or 10 upper-division semester units	<ul style="list-style-type: none"> <li>• 20 semester units are required if a combination of upper- and lower-division units are completed</li> <li>• the “Introductory” subjects require at least one course in each of the specified areas (college algebra, geometry, and development of the real number system or introduction to mathematics; or three courses in calculus or other mathematics courses for which intermediate algebra and geometry are prerequisites) - the balance of the 10 or 20 units may be in any course within the subject category</li> <li>• a grade of “C” or higher is required in every course used to meet this requirement</li> </ul>

The Subject Matter Authorization requires an individual to have completed a minimum of 32 semester units across five content areas that are aligned to the K-12 courses it authorizes. However, the Supplementary Authorization in Introductory Mathematics requires an individual to have completed only 10 upper division or 20 total semester units, including one course in Algebra, and does not require any coursework in Probability and Statistics. The Supplementary Authorization in Introductory Mathematics authorization statement, therefore, seems to go beyond the actual preparation required to earn the authorization.

**Temporary Authorizations**

The four temporary authorizations listed in Rows F-I of Table 1 are each designed to meet specific, temporary needs of public school districts.

Content Preparation: The content preparation required for the four temporary authorizations varies from no specific coursework requirements in mathematics to passage of the subject matter requirement. The Short-Term Staff Permit (STSP) may be issued to an individual who has satisfied the subject matter requirement but has not completed other credential requirements or is unable to enroll in an internship program. The STSP is also available to an individual with a minimum of 9 upper division units or 18 semester units in math. Therefore the individual teaching on a STSP may or may not have met the subject matter requirement for either the Single Subject teaching credential in Mathematics or Foundational-Level Mathematics. A STSP may be issued only once for one school year for an acute staffing need.

The Provisional Internship Permit (PIP) is designed for an individual who has not satisfied the subject matter requirement. A minimum of 9 upper division units or 18 semester units in math is required for initial issuance of a PIP in math. This is a temporary document, issued for one year at an employer’s request. It may be renewed once if the individual has taken all of the subject-

matter examinations in math. The two-year period is designed to allow the individual to meet the subject matter requirement and move into an internship program.

California has many provisions within the Education Code and Title 5 Regulations that provide legal avenues for assignment of certificated employees outside their basic state authorization. These Local Teaching Assignment Options (LTAO) allow local school districts the flexibility to assign fully credentialed teachers to teach subjects other than those authorized by the credential held. The reason the teacher is not authorized for the assignment is usually because he or she has not satisfied the subject matter requirement to add the authorization to their credential. The local school board must approve the LTAO on an annual basis.

The Limited Assignment Teaching Permit process was designed for fully credentialed general education teachers to teach outside of their authorized area while completing the requirements to earn an additional authorization. The Limited Assignment Teaching Permit in Mathematics does not require that the fully credentialed teacher has completed any units in mathematics initially. A Limited Assignment Teaching Permit may be issued only at the request of a local employing agency for three, one-year periods if renewal requirements (completion of course work or passage of exams in math) are completed. It allows flexibility for the local employing agencies, especially in rural and remote areas of the state, to assign an individual to teach in more than one subject area.

All four of these authorizations are designed for specific needs in public school districts and have specific restrictions on the use and length of time the authorization may be used.

### **Issues for Future Commission Consideration**

This agenda item contains information about all the authorizations that allow individuals to teach mathematics in California public schools. With two of the authorizations staff has identified a misalignment between the preparation required and what the document authorizes. As a result, staff raises the following two questions for Commission discussion.

- Since the Multiple Subject credential authorizes teaching in grades K-12 in self-contained classes, should the misalignment between what the Multiple Subject credential holder is authorized to teach with respect to Mathematics and the content preparation required for the credential be addressed?
- Should the misalignment between what the Supplementary Authorization in Introductory Mathematics authorizes and the preparation required to earn that authorization be addressed?

Staff requests direction from the Commission whether it should pursue either or both of the above issues, and, if so, whether staff should bring to the Commission at a future meeting some potential options for addressing either or both of these issues.