

## **Algebra II College and Career Readiness Plan of Action**

### **Background**

At the request of Senator Florence Shapiro, Chair of the Senate Education Committee, and Representative Rob Eissler, Chair of the House Public Education Committee, Commissioner Robert Scott directed the Texas Education Agency (TEA) staff to work with representatives from the Texas Higher Education Coordinating Board (THECB) to develop a plan of action to further define college and career readiness standards (CCRS) as they relate to Algebra II. The plan specified that a committee of Algebra II content specialists do the following:

- create a list of standards in the new Algebra II Texas Essential Knowledge and Skills (TEKS) for Algebra II that are critical to college and career readiness,
- identify the specific Texas CCRS with which these critical TEKS standards align,
- compare the identified critical CCRS to various established national CCRS, and
- draft preliminary performance expectations associated with these critical CCRS.

### **Process**

The first all-day meeting was held on March 6, 2009. Dave Spence, President of the Southern Regional Education Board, provided the committee with background information on the initiative, including the Legislature's end goal: that the identified critical CCRS and preliminary performance expectations will be used for assessment, teacher preparation, professional development, and instructional materials. The impact of accomplishing this goal is that all Texas educators can develop a better understanding of what changes are needed in K–12 education to ensure that students are college and career ready.

The committee met a total of four times at TEA and had one conference call. The face-to-face meetings typically began at 9:00 am and ended at 4:00 pm. The meeting dates were Friday, March 6, 2009; Monday, March 30, 2009; Wednesday, April 15, 2009; and Thursday, April 23, 2009. The conference call occurred on the afternoon of Friday, March 27, 2009. A few email assignments were disseminated so that meeting time might be optimized. These assignments allowed the committee members to provide their individual perspective on the alignment tasks.

The Algebra II committee included Julie Guthrie, TEA Director of Math & Science Assessments, Student Assessment Division; Larry Duncan TEA Manager, Student Assessment Division; Erin McNeely, TEA Student Assessment Division; Karen Grad, TEA Student Assessment Division; Norma Torres-Martinez, TEA Foundation Unit Director, Curriculum Division; Erika Pierce, TEA Assistant Director of Mathematics, Curriculum Division; Evelyn Hiatt, THECB Deputy Assistant Commissioner for P–16 Initiatives; Lynette Heckman, THECB Director, College Readiness Initiatives; Dr. Selina Vásquez Mireles, Associate Professor of Mathematics, Texas State University; Araceli Ortiz, THECB Director, Educator Quality; and George Powell, Vice President and COO, K–12 Assessments, Educational Testing Service. The meetings were facilitated by

Joseph Kulhanek, Ph.D., TEA Director, College and Career Readiness Program, Curriculum Division and Michele Moore Harkrider, TEA Senior Policy Advisor to Deputy Commissioner Lizzette Reynolds.

### **Critical Algebra II TEKS**

Although the original charge utilized the phrase *critical*, the committee discussed other terms such as *priority*, *key*, *crucial*, and *most important*. A list of clarifying descriptors was also produced. Critical Algebra II TEKS were defined as those that are most important for a student in terms of being ready and prepared for a college algebra course.

The guidelines that informed the process include the following considerations:

- “such as” components of Algebra II TEKS were bypassed,
- prerequisite coursework such as Algebra I content was assumed,
- liberty was taken to identify all or parts of a student expectation as critical on a case-by-case basis,
- explanatory statements that mirrored discussion were provided, and
- core ideas were emphasized as opposed to content that could be considered an extension (e.g., the idea of inequalities is an extension of the core idea of equations).

Through careful analysis of the Algebra II TEKS, it was determined that emphasis should be placed on the quadratic family of functions. In addition, contextual situations should permeate the entire course. In addition, families of functions other than linear and quadratic should be introduced to support the idea that functions follow similar patterns.

### **Performance Expectations**

The development of performance expectations was based on an understanding that a student who "minimally" meets all of the defined expectations would be considered college and career ready. In other words, one who has satisfactorily demonstrated the prerequisite skills would be ready to enter a college algebra course.

When identifying the performance expectations, the committee used guidelines that included standard objective formatting. For instance, it was agreed to begin each performance expectation with an action verb. Throughout the process careful consideration of related converse statements were taken into account.

Discussions that emerged while developing performance expectations were similar to those that resulted from the previous work. Moreover, the committee found an opportunity to provide more interpretation to the overall work through this piece. In creating the performance expectations it was imperative to speak to the nature of the scope of the Algebra II TEKS. Thus, the committee found instances where elaboration and/or refinement were needed. Examples, within the table, can be found relative to rational functions, systems of equations, and transformations.

## **Alignment to the CCRS**

As noted earlier, the CCRS document indicates standards for entry into and subsequent success in College Algebra. The guidelines that informed the process included the following considerations:

- identification of critical Algebra II TEKS that are most important for a college and career ready student (underlined and in blue) which shows a correlation between those TEKS and the CCRS,
- review of the relationship between the standards, which included the identification of the CCRS in key content areas I–VII that have the strongest alignment to an Algebra II course (e.g., CCRS from Algebraic Reasoning, key content area II, are noted in red, and CCRS from Functions, key content area VII, are noted in green),
- identification of contextual situations within the TEKS and additional CCRS from Measurement Reasoning (IV) as included in this correlation because those skills are often used as the context for an algebra problem (e.g., the contextual situation for a system of equations could be the perimeter of a figure (IV.C.1)), and
- review of the key content areas of the CCRS, that is, Problem Solving and Reasoning (VIII), Communication and Representation (IX), and Connections (X), not explicitly identified in this correlation because these process skills are represented throughout the Algebra II TEKS.

The critical Algebra II TEKS were held constant and each of the CCRS were reviewed for alignment. The nature of the CCRS, i.e., namely the interdisciplinary aspect, and emphasis on habits of mind and reasoning (as highlighted in the titles) resulted in several CCRS aligned to one Algebra II TEKS. The committee was guided by a decision to encompass any CCRS that at least one committee member found to be linked to the critical Algebra II TEKS. The committee chose to postpone alignment to the process standards since it was believed that the process standards should and would permeate the entire course. For consistency, the most specific delineation of the standards was used. The general consensus was that Algebra II has strong alignment with two content standards: Algebraic Reasoning and Functions. Other standards that were mapped arose primarily from contextual situations.

## **Alignment to National Standards**

As with the alignment guidelines for the CCRS, the critical Algebra II TEKS were anchored and the most specific delineation of the standards was used. The guidelines that informed the process included the following:

- identification of critical Algebra II TEKS that are most important for a college and career ready student (underlined and in blue),
- illustration of the correlation between those TEKS and the CCRS (second column), and

- comparison of the identified TEKS to several national college and career readiness standards (third column).

In reviewing the relationship between the critical Algebra II TEKS and the national college and career readiness standards, the committee looked for skills within these standards that were similar to those skills indicated in the critical Algebra II TEKS. The committee evaluated the Texas College and Career Readiness Standards, the College Board Standards for College Success, the ACT College Readiness Standards, the American Diploma Project College and Workplace Readiness Benchmarks, and the Standards for Success. This segment was primarily addressed through e-mail correspondence.

### **Emergent Themes**

- The Algebra II TEKS are rigorous and will prepare a student to be college and career ready.
- The requested CCRS performance levels are clearly identifiable within the Algebra II TEKS.
- The Algebra II TEKS are clearly aligned with the mathematics CCRS.
- The Algebra II TEKS are clearly aligned with national CCRS.

Overall, the committee found the efforts valuable and informative. A suggestion for future work includes addressing language issues. At various times, the committee grappled with arriving at consensus with terminology. For example, what is meant by “multiple representations”? Does “verbal representation” imply “contextual situations”? The recommendation is that a list of operating definitions be established and utilized for similar initiatives.