MATHEMATICS

Graduation Requirement Guidance

for Students Entering Ninth Grade in 2012-2013

NOTE: SBOE approved revisions to 160-4-2-.48 HIGH SCHOOL GRADUATION REQUIREMENTS FOR STUDENTS ENROLLING IN THE NINTH GRADE FOR THE FIRST TIME IN THE 2008-2009 SCHOOL YEAR AND SUBSEQUENT YEARS after July 2012 could result in changes to this guidance document.

Table of Contents

Executive Summary

Successful preparation for both postsecondary education and employment requires learning the same rigorous mathematics content and skills. No longer do students planning to enter the workplace after high school need a different and less rigorous mathematics curriculum than those planning to go to college. (Achieve, Inc., 2004)

In 2007, Georgia's State Board of Education adopted rigorous new graduation requirements effective with the ninth grade class of 2008. A hallmark of the rule was the elimination of tiered-diploma options where students followed either College Preparatory or Technology/Career coursework. All students are expected to complete a common set of mathematics requirements to earn a regular diploma. The rule specifies certain mathematics courses that all students must take – making rigorous content an expectation for all and not just for some of Georgia's students and ensured that all students are given the opportunity to choose mathematics courses that could include Advanced Placement, International Baccalaureate, and dual enrollment courses. Additionally, the rule encourages active student involvement in selecting mathematics courses based on the students' areas of interest.

The Georgia State Board of Education's 2010 adoption of the Common Core State Standards in mathematics, English/ Language Arts, and literacy is a significant step toward ensuring that Georgia's K-12 students are prepared to enter the 21st century global workplace. As specified by the Council of Chief State School Officers and the National Governors Association, the Common Core State Standards are research- and evidence-based, aligned with college and work expectations, rigorous, and internationally benchmarked. The Standards are intended to be a living work; so as new and better evidence emerges, the Standards will be revised accordingly. As a natural outgrowth of meeting the charge to define college and career readiness, the Standards define what students should understand and be able to do in their study of mathematics. At its July 8, 2010 meeting, the State Board of Education adopted the Common Core State Standards to be known in Georgia as the Common Core Georgia Performance Standards (CCGPS). CCGPS Mathematics will be implemented in Georgia's K- 9 classrooms in the 2012-2013 school year so as to be fully implemented in K-12 classrooms by school year 2015-2016.

The Common Core State Standards for *Mathematical Practice* represent the habits and attitudes of mathematical thinkers and are integral to the super structure of CCGPS mathematics. The practice standards define the way knowledge comes together and gets used by students. The Standards *for Mathematical Practice* describe the expertise that mathematics educators at all levels should seek to develop in their students. The practices are as follows:

- Make sense of problems and persevere in solving them;
- Reason abstractly and quantitatively;
- Construct viable arguments and critique the reasoning of others;
- Model with mathematics;
- Use appropriate tools strategically;
- Attend to precision;
- Look for and make use of structure;
- Look for and express regularity in repeated reasoning.

The Common Core State Standards *for Mathematical Content* offer a balanced combination of procedure and understanding. A lack of understanding effectively prevents a student from engaging in the mathematical practices. Designers of curriculum, assessment, and professional development should all attend to the need to connect the mathematical practice to mathematical content in mathematics instruction.

Mathematics requirements associated with the 2007 graduation rule are currently aligned with the Georgia Performance Standards (GPS) and/or Common Core Georgia Performance Standards (CCGPS) for mathematics. The Georgia Performance Standards and the Common Core Georgia Performance Standards for Mathematics are comparable in all domains. While there are differences in strand names and grade level expectations, the efficacy of the two sets of standards is evident. A wide range of mathematics courses provide opportunities for students to continue advanced coursework, to take advantage of academic support classes, and to choose special interest courses, depending on individual needs and aspirations. An increased number of students with disabilities now have the opportunity to earn a regular education diploma, thus enabling them to become employed or to go on to postsecondary education. The mathematics graduation requirements associated with the 2007 graduation rule, along with state curriculum standards and assessments, will ensure that more students finish school ready to thrive in our knowledge-based, high-skills economy.

Key Feature of the 2007 State Board of Education Rule 160-4-2-.48 Requirements

Four units of core credit in mathematics, including CCGPS Coordinate Algebra, GPS Mathematics I, GPS Algebra, or the equivalent; CCGPS Analytic Geometry, GPS Mathematics II, GPS Geometry, or the equivalent; and CCGPS Advanced Algebra, GPS Mathematics III, GPS Advanced Algebra, or the equivalent. Additional core courses needed to complete four credits in mathematics must be chosen from the list of GPS/ CCGPS /AP/IB/dual enrollment designated courses.

Mathematics Graduation Requirement Guidance
for Students Entering Ninth Grade in 2012-2013

Section 1: Georgia HS Graduation Requirements for Students Entering Ninth Grade in 2012-2013

Four units of credit in mathematics shall be required of all students entering ninth grade in 2012-2013, to include:

- CCGPS Coordinate Algebra or its equivalent,
- CCGPS Analytic Geometry or its equivalent,
- CCGPS Advanced Algebra or its equivalent, and
- One Additional Unit to be selected from the list of CCGPS/GPS/AP/IB/dual enrollment designated courses.

NOTE: Accelerated CCGPS Coordinate Algebra/Analytic Geometry A and Accelerated CCGPs Analytic Geometry B/Advanced Algebra include the standards of CCGPS Coordinate Algebra, CCGPS Analytic Geometry, and CCGPS Advanced Algebra. At the present time, these are the only equivalent courses for CCGPS Coordinate Algebra, CCGPS Analytic Geometry, and CCGPS Advanced Algebra.

Students with disabilities who enter ninth grade in 2012-2013 and who earn credit in CCGPS Coordinate Algebra and the associated mathematics support course, and earn credit in CCGPS Analytic Geometry and the associated mathematics support course may, upon determination through the Individualized Education Plan process, meet diploma requirements by completing CCGPS Advanced Algebra for a total of 3 mathematics core credits. Completion of 3 units of mathematics may not meet mathematics admission requirements for entrance into a University System of Georgia institution or other post-secondary institution without additional course work.

Students who completed GPS high school mathematics courses in middle school in 2011-2012 will be able to continue the GPS sequence of courses when they enter high school in 2012-1023. Students who completed GPS Mathematics I or GPS Algebra are prepared for GPS Mathematics II or GPS Geometry, respectively, in 2012-2013.Students who completed Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry are prepared for Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced Algebra, respectively, in 2012-2013.

High school credit for mathematics courses taken in middle school before 2012-2013 should be awarded only for courses that included concepts and skills based on the Georgia Performance Standards (GPS) for grades 9-12 or those approved by the State Board of Education. All course requirements, including associated End of Course requirements, must be met prior to granting credit.

The 2011 Graduation Rule Amendment expanded the available high school GPS courses to include GPS discrete mathematics courses (GPS Algebra and Accelerated GPS Algebra/Geometry, etc.) which were made available to middle schools offering high school courses for advanced middle school students.

High School unit credit is not awarded for courses that address concepts and skills associated with grades K-8.

Students who completed GPS mathematics courses in middle school in 2011-2012 will be able to continue the GPS sequence of courses when they enter high school in 2012-1023. Students who completed GPS Mathematics I or GPS Algebra are prepared for GPS Mathematics II or GPS Geometry, respectively, in 2012-2013.Students who completed Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry are prepared for Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced Algebra, respectively, in 2012-2013.

Section 2: Mathematics Course Sequence Information for Students Entering Ninth Grade in 2012-2013

Flowchart for Students Entering Ninth Grade in School Year 2012-2013					
GRADE	Option 1	Option 2	Option 3	Option 4	Option 5
			Advanced	Accelerated	Accelerated
6	Grade 6 GPS	Grade 6 GPS	Grade 6 Advanced GPS	Grade 6-8 Advanced GPS	Grade 6-8 Advanced GPS
7	Grade 7 GPS	Grade 7 GPS	Grade 7 Advanced GPS		
8 2011-2012	Grade 8 GPS	Grade 8 GPS	Grade 8 Advanced GPS	GPS Mathematics I or GPS Algebra	Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry
9 2012-2013	CCGPS Coordinate Algebra	Accelerated CCGPS Coordinate Algebra/Analytic Geometry A	Accelerated CCGPS Coordinate Algebra/Analytic Geometry A	GPS Mathematics II or GPS Geometry	Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced Algebra
10	CCGPS Analytic Geometry	Accelerated CCGPS Analytic Geometry B/ Advanced Algebra	Accelerated CCGPS Analytic Geometry B/ Advanced Algebra	GPS Mathematics III or GPS Advanced Algebra	Accelerated GPS Mathematics III or Accelerated GPS Pre-Calculus
11	CCGPS Advanced Algebra	Accelerated CCGPS Pre-Calculus	Accelerated CCGPS Pre-Calculus	Fourth Mathematics Course Options*; IB Courses**; Dual*** & Joint Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual*** & Joint Enrollment Courses
12	Fourth Mathematics Course Options*; IB Courses**; Dual*** & Joint Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual*** & Joint Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual*** & Joint Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual*** & Joint Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual*** & Joint Enrollment Courses

* Fourth Mathematics Course Options are listed in Chart A on page 7.

**International Baccalaureate Course Sequences are provided in Chart B on pages 8 and 9.

***Additions to the High School Roster of ACCEL-Aligned Courses are provided on page 10.

CHART A: CCGPS/GPS Fourth Mathematics Course Options for Students Entering Ninth Grade in 2012-2013

	4th Mathematics	Suggested Prerequisite Courses
27.09740	CCGPS Pre-Calculus	CCGPS: Coordinate Algebra + Analytic Geometry + Advanced Algebra OR CCGPS: Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra
27.08400	GPS Mathematics IV	GPS: Mathematics I + Mathematics II+ Mathematics III OR GPS: Accelerated Mathematics I + Accelerated Mathematics II
27.06240	GPS Pre-Calculus	GPS: Algebra + Geometry + Advanced Algebra OR GPS: Accelerated Algebra/Geometry A + Accelerated Geometry B/Advanced Algebra
27.08500	Advanced Mathematical Decision Making (AMDM)	CCGPS: Coordinate Algebra + Analytic Geometry + Advanced Algebra OR CCGPS: Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra GPS: Mathematics I + Mathematics II+ Mathematics III OR GPS: Accelerated Mathematics I + Accelerated Mathematics II GPS: Algebra + Geometry + Advanced Algebra OR GPS: Accelerated Algebra/Geometry A + Accelerated Geometry B/Advanced Algebra
27.08600	Mathematics of Industry and Government (MIG)	CCGPS: Coordinate Algebra + Analytic Geometry + Advanced Algebra OR CCGPS: Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra GPS: Mathematics I + Mathematics II+ Mathematics III OR GPS: Accelerated Mathematics I + Accelerated Mathematics II GPS: Algebra + Geometry + Advanced Algebra OR GPS: Accelerated Algebra/Geometry A + Accelerated Geometry B/Advanced Algebra
27.08700	Mathematics of Finance (MOF)	LEA Flexibility
27.07400	AP Statistics	CCGPS: Coordinate Algebra + Analytic Geometry + Advanced Algebra OR CCGPS: Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra GPS: Mathematics I + Mathematics II+ Mathematics III OR GPS: Accelerated Mathematics I + Accelerated Mathematics II GPS: Algebra + Geometry + Advanced Algebra OR GPS: Accelerated Algebra/Geometry A + Accelerated Geometry B/Advanced Algebra
27.07200	AP Calculus AB	CCGPS: Coordinate Algebra + Analytic Geometry + Advanced Algebra + Pre-Calculus OR CCGPS: Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra +Accelerated Pre-Calculus GPS: Mathematics I + Mathematics II+ Mathematics III + Mathematics IV OR GPS: Accelerated Mathematics I + Accelerated Mathematics II + Accelerated Mathematics III GPS: Algebra + Geometry + Advanced Algebra + Pre-Calculus OR GPS: Accelerated Algebra/Geometry A + Accelerated Geometry B/Advanced Algebra + Accelerated Pre-Calculus
27.07300	AP Calculus BC	CCGPS: Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra +Accelerated Pre-Calculus GPS: Accelerated Mathematics I + Accelerated Mathematics II + Accelerated Mathematics III GPS: Accelerated Algebra/Geometry A + Accelerated Geometry B/Advanced Algebra + Accelerated Pre-Calculus Algebra, Accelerated GPS Pre-Calculus
27.05200	History of Mathematics	AP Calculus AB or BC (may be taken concurrently with AP Calculus); 0.5 elective credit only
27.07700	Multivariable Calculus	AP Calculus BC

Mathematics Graduation Requirement Guidance

for Students Entering Ninth Grade in 2012-2013

CHART B: International Baccalaureate Mathematics-CCGPS/GPS Mathematics Course Sequences for Students Entering Ninth Grade in 2012-2013 – Page 1

Grade	Option 1	Option 2		Option 3	Option 4	Option 5	Option 6
						MS Acceleration	MS Acceleration
6	Grade 6 GPS	Grade 6 GPS		Grade 6 GPS	Grade6 GPS	Grades 6-8 GPS	Grades 6-8 GPS
7	Grade 7 GPS	Grade 7 GPS		Grade7 GPS	Grade 7 GPS		
8 2011-2012	Grade 8 GPS	Grade 8 GPS		Grade 8 GPS	Grade 8 GPS	GPS Mathematics I or GPS Algebra	Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry
9 2012-2013	CCGPS Coordinate Algebra	CCGPS Coordinate Algebra		Accelerated CCGPS Coordinate Algebra/Analytic Geometry A	Accelerated CCGPS Coordinate Algebra/Analytic Geometry A	GPS Mathematics II or GPS Geometry	Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced Algebra
10	CCGPS Analytic Geometry	CCGPS Analytic Geometry		Accelerated CCGPS Geometry B/ Advanced Algebra	Accelerated CCGPS Geometry B/ Advanced Algebra	GPS Mathematics III or GPS Advanced Algebra	Accelerated GPS Mathematics III or Accelerated GPS Pre- Calculus or IB Mathematics Studies*
11	CCGPS Advanced Algebra	CCGPS Advanced Algebra: **Block**	CCGPS Pre-Calculus or IB Mathematics Studies*: **Block**	Accelerated CCGPS Pre-Calculus or IB Mathematics Studies*	Accelerated CCGPS Pre-Calculus or IB Mathematics SL*	IB Mathematics Studies*	IB Mathematics SL*
12	IB Mathematics Studies	IB Mathematics SL		IB Mathematics SL	IB Mathematics HL or AP Calculus AB/BC, AP Statistics	IB Mathematics SL	IB Mathematics HL or AP Calculus AB/BC, AP Statistics

**After students meet the diploma requirements for IB Standard Level, additional choices for the fourth year could include Advanced Mathematical Decision Making, Mathematics of Industry and Government, Mathematics of Finance, AP Statistics, and AP Calculus AB/BC.*

CHART B: International Baccalaureate Mathematics-CCGPS/GPS Mathematics Course Sequences for Students Entering Ninth Grade in 2012-2013 – Page 2

Option 1: This option includes grade-level standards in middle school. After completing CCGPS Advanced Algebra, students may take IB Mathematics Studies to meet the diploma requirements associated with IB Standard Level Mathematics.

Option 2: This option includes grade-level standards in middle school. After completing the CCGPS Coordinate Algebra, Analytic Geometry, Advanced Algebra sequence, students may take CCGPS Pre- Calculus or IB Math Studies, followed by IB Mathematics SL, to meet the diploma requirements associated with IB Standard Level.

Option 3: This option includes grade-level standards in middle school. Students who successfully complete middle grades standards can take Accelerated CCGPS Coordinate Algebra/Analytic Geometry A and Accelerated CCGPS Analytic Geometry B/Advanced Algebra, then Accelerated CCGPS Pre-Calculus, or IB Math Studies, followed by IB Mathematics SL to meet IB Standard Level Mathematics diploma requirements.

Option 4: This option includes grade-level standards in middle school. Students who successfully complete middle grades standards can take the accelerated CCGPS mathematics pathways. After Accelerated CCGPS Pre-Calculus, and/or IB Mathematics SL, students may choose IB Mathematics HL to meet the IB diploma requirements for Higher Level.

Option 5: This option requires the compacting of three years of middle grades standards into two years during school years 2009-2010 and 2010-2011and the completion of GPS Mathematics I or GPS Algebra in the 8th grade in 2011-2012. After completing the GPS Mathematics I – III or the GPS Algebra, GPS Geometry, GPS Advanced Algebra sequence, students may take IB Mathematics Studies and IB Mathematics SL to meet the IB diploma requirements for Standard Level Mathematics.

Option 6: This option is for students who are highly talented in mathematics. It requires the compacting of three years of middle grades standards into two years during school years 2009-2010 and 2010-2011 and Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry in 8th grade in 2011-2012. After completing Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced Algebra, students may take Accelerated GPS Mathematics III, Accelerated GPS Pre-Calculus, or IB Mathematics SL followed by Mathematics HL to meet the IB diploma requirements for Higher Level Mathematics.

Key to IB Course Names, based on International Baccalaureate Organization's Hierarchical Listing: www.ibo.org/diploma/curriculum/group5

- *Mathematical Studies Standard Level* — IB Mathematics Studies
- *Mathematical Methods Standard Level* — IB Mathematics SL
- *Mathematics Higher Level* — IB Mathematics HL
- *Further Mathematics Standard Level**

* At this time, no requests to offer this course have been submitted.

ACCEL Program: High School Course Roster Additions

The courses and course codes below are *inactive* and will not appear on the IDA-3 roster of state-funded courses

The courses and course codes below are to be used ONLY to report dual enrollment credit for a college course which ACCEL has aligned to the *inactive* course.

27.07910	College Statistics A
27.07920	College Statistics B
27.08010	College Calculus A
27.08020	College Calculus

Section 3: High School Mathematics Course Descriptions

Georgia Mathematics

The Georgia Mathematics Curriculum focuses on actively engaging students in the development of mathematical understanding by encouraging the use of manipulatives and a variety of representations (e.g., concrete, symbolic, verbal, graphical), by supporting independent and cooperative work to solve problems, by emphasizing estimation and fluent

computation, and by offering opportunities to conduct investigations and to report findings. The Common Core Georgia Performance Standards (CCGPS) and Georgia Performance Standards (GPS) mathematics courses expect students to apply mathematical concepts and skills in the context of authentic problems and to understand concepts, rather than to merely follow a sequence of procedures. In Georgia mathematics classrooms, students will develop the habits of mathematical thinkers, will learn to think critically in a mathematical way with an understanding that there are different means to a solution, and will be given opportunities to explain their thinking and to critique the thinking of others. The three facets of rigor, which are conceptual understanding, fluency, and application, will be pursued with equal intensity. The GPS process standards and the CCGPS mathematical practice standards define the reasoned, logical connections that make mathematics manageable and are integral to the structure of the mathematics. The process/ practice standards underpin the coherence and focus inherent in the content of both curricula.

In CCGPS mathematics, content is divided into clusters of standards and addressed in unit size pieces. The grade level clusters are not emphasized equally, but none can be neglected or ignored without negative consequences to the learning progression. After all, grade level content is not a new event, but rather an extension of previous learning and a prelude to future learning. In CCGPS K-5 mathematics, less attention is given to data and statistics than in GPS. In grades 6-8, expressions, equations, and the number system continue to be emphasized. The high school CCGPS courses add a modeling category and demonstrate a decided shift from Euclidean geometry to transformational geometry, as transformational geometry is more closely and transparently related to algebra and functions and is the geometry actually used in real world situations.

CCGPS High School Mathematics

CCGPS Coordinate Algebra

This is the first in a sequence of three high school courses designed to ensure career and college readiness. The course represents a discrete study of algebra with correlated statistics applications and a bridge to the second course through coordinate geometric topics. The course requires that students:

- Reason quantitatively and use units to solve problems
- Interpret the structure of expressions
- Create linear and exponential equations that describe numbers or relationships
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable and systems of linear equations
- Represent and solve equations and inequalities graphically
- Understand the concept of a function and use function notation
- Interpret functions that arise in applications in terms of the context
- Analyze linear and exponential functions using different representations
- Build a function that models a relationship between two quantities and new functions from existing functions
- Construct and compare linear and exponential models and solve problems
- Interpret expressions for functions in terms of the situation they model
- Experiment with transformations in the plane
- Use coordinates to prove simple geometric theorems algebraically
- Summarize, represent, and interpret data on a single count or measurement variable and on two categorical and quantitative variables
- Interpret linear models

CCGPS Analytic Geometry

This is the second course in a sequence of three high school courses designed to ensure career and college readiness. The course embodies a discrete study of geometry analyzed by means of algebraic operations with correlated probability/statistics applications and a bridge to the third course through algebraic topics. The course requires that students:

- Extend the properties of exponents to rational exponents
- Use properties of rational and irrational numbers; perform arithmetic operations with complex numbers
- Use complex numbers in polynomial identities and equations
- Understand congruence in terms of rigid motions
- Prove geometric theorems
- Make geometric constructions
- Understand similarity in terms of similarity transformations and prove theorems involving similarity
- Define trigonometric ratios and solve problems involving right triangles
- Understand and apply theorems about circles; find arc lengths and areas of sectors of circles
- Translate between the geometric description and the equation for a conic section
- Use coordinates to prove simple geometric theorems algebraically
- Explain volume formulas and use them to solve problems
- Interpret the structure of expressions; write expressions in equivalent forms to solve problems
- Perform arithmetic operations on polynomials
- Create equations that describe numbers or relationships
- Solve equations and inequalities in one variable and systems of equations
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations
- Build a function that models a relationship between two quantities; build new functions from existing functions
- Construct and compare linear, quadratic, and exponential models and solve problems
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Understand independence and conditional probability and use them to interpret data
- Use the rules of probability to compute probabilities of compound events in a uniform probability model

CCGPS Advanced Algebra

This is the culminating course in a sequence of three high school courses designed to ensure career and college readiness. It is designed to prepare students for fourth course options relevant to their career pursuits. The course requires that students:

- Use complex numbers in polynomial identities and equations.
- Interpret the structure of expressions; write expressions in equivalent forms to solve problems
- Perform arithmetic operations on polynomials
- Understand the relationship between zeros and factors of polynomials
- Use polynomial identities to solve problems
- Rewrite rational expressions
- Create equations that describe numbers or relationships
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve systems of equations; represent and solve equations and inequalities graphically

- Interpret functions that arise in applications in terms of the context; analyze functions using different representations
- Build a function that models a relationship between two quantities; build new functions from existing functions
- Construct and compare linear, quadratic, and exponential models and solve problems
- Extend the domain of trigonometric functions using the unit circle
- Model periodic phenomena with trigonometric functions
- Prove and apply trigonometric identities
- Visualize relationships between two-dimensional and three-dimensional objects;
- Apply geometric concepts in modeling situations
- Summarize, represent, and interpret data on a single count or measurement variable
- Understand and evaluate random processes underlying statistical experiments
- Make inferences and justify conclusions from sample surveys, experiments, and observational studies

CCGPS Pre-Calculus

This is a fourth mathematics course designed to prepare students for calculus and other college level mathematics courses. The course requires that students:

- Perform arithmetic operations with complex numbers
- Represent complex numbers and their operations on the complex plane
- Represent and model with vector quantities
- Perform operations on vectors
- Perform operations on matrices and use matrices in applications
- Solve systems of equations
- Build new functions from existing functions
- Extend the domain of trigonometric functions using the unit circle
- Model periodic phenomena with trigonometric functions
- Prove and apply trigonometric identities
- Apply trigonometry to general triangles
- Translate between the geometric description and the equation for a conic section
- Use the rules of probability to compute probabilities of compound events in a uniform probability model
- Calculate expected values and use them to solve problems
- Use probability to evaluate outcomes of decisions

Accelerated CCGPS Coordinate Algebra/Analytic Geometry A

This is the first in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Reason quantitatively and use units to solve problems
- Interpret the structure of expressions
- Create linear and exponential equations that describe numbers or relationships
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable and systems of linear equations
- Represent and solve equations and inequalities graphically
- Understand the concept of a function and use function notation
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations

- Build a function that models a relationship between two quantities and new functions from existing functions
- Construct and compare linear and exponential models and solve problems
- Interpret expressions for functions in terms of the situation they model
- Experiment with transformations in the plane
- Use coordinates to prove simple geometric theorems algebraically
- Understand congruence in terms of rigid motions
- Prove geometric theorems
- Make geometric constructions
- Understand similarity in terms of similarity transformations and prove theorems involving similarity
- Define trigonometric ratios and solve problems involving right triangles
- Understand and apply theorems about circles; find arc lengths and areas of sectors of circles
- Explain volume formulas and use them to solve problems
- Summarize, represent, and interpret data on a single count or measurement variable and on two categorical and quantitative variables
- Interpret linear models

Accelerated CCGPS Analytic Geometry B/Advanced Algebra

This is the second in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Extend the properties of exponents to rational exponents
- Use properties of rational and irrational numbers; perform arithmetic operations with complex numbers
- Perform arithmetic operations on polynomials
- Use complex numbers in polynomial identities and equations
- Interpret the structure of expressions; write expressions in equivalent forms to solve problems
- Understand the relationship between zeros and factors of polynomials
- Use polynomial identities to solve problems
- Rewrite rational expressions
- Create equations that describe numbers or relationships
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable
- Solve systems of equations; represent and solve equations and inequalities graphically
- Interpret functions that arise in applications in terms of the context; analyze functions using different representations
- Build a function that models a relationship between two quantities; build new functions from existing functions
- Construct and compare linear, quadratic, and exponential models and solve problems
- Extend the domain of trigonometric functions using the unit circle
- Model periodic phenomena with trigonometric functions
- Prove and apply trigonometric identities
- Translate between the geometric description and the equation for a conic section
- Use coordinates to prove simple geometric theorems algebraically
- Visualize relationships between two-dimensional and three-dimensional objects;
- Apply geometric concepts in modeling situations
- Summarize, represent, and interpret data on a single count or measurement variable
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Understand and evaluate random processes underlying statistical experiments

- Make inferences and justify conclusions from sample surveys, experiments, and observational studies

Accelerated CCGPS Pre-Calculus

This is the third in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Perform arithmetic operations with complex numbers.
- Represent complex numbers and their operations on the complex plane.
- Represent and model with vector quantities
- Perform operations on vectors.
- Perform operations on matrices and use matrices in applications
- Solve systems of equations
- Build new functions from existing functions
- Extend the domain of trigonometric functions using the unit circle
- Model periodic phenomena with trigonometric functions
- Prove and apply trigonometric identities
- Apply trigonometry to general triangles
- Translate between the geometric description and the equation for a conic section
- Use the rules of probability to compute probabilities of compound events in a uniform probability model
- Calculate expected values and use them to solve problems
- Use probability to evaluate outcomes of decisions

GPS High School Mathematics - Integrated Delivery System

GPS Mathematics I: Algebra/Geometry/Statistics

This is the first in a sequence of mathematics courses designed to ensure that students are college and work ready. The course requires that students:

- Explore the characteristics of basic functions utilizing tables, graphs, and simple algebraic techniques
- Operate with radical, polynomial, and rational expressions
- Solve a variety of equations, including quadratic equations with leading coefficient of one, radical equations, and rational equations
- Investigate properties of geometric figures in the coordinate plane
- Use the language of mathematical argument and justification
- Discover, prove, and apply properties of polygons
- Utilize counting techniques and determine probability
- Use summary statistics to compare samples to populations
- Explore the variability of data

GPS Mathematics II: Geometry/Algebra II/Statistics

This is the second in a sequence of mathematics courses designed to ensure that students are college and work ready. The course requires that students:

- Represent and operate with complex numbers

- Use numerical, graphical, and algebraic techniques to explore quadratic, exponential, and piecewise functions and to solve quadratic, exponential and absolute value equations and inequalities
- Use algebraic models to represent and explore real phenomena
- Explore inverses of functions
- Use right triangle trigonometry to formulate and solve problems
- discover, justify, and use properties of circles and spheres
- Use sample data to make informal inferences about population means and standard deviations
- Fit curves to data and examine the issues related to curve fitting

GPS Mathematics III: Advanced Algebra/Statistics

This is the third in a sequence of mathematics courses designed to ensure that students are college and work ready. The course requires that students:

- Analyze polynomial functions of higher degree
- Explore logarithmic functions as inverses of exponential functions
- Solve a variety of equations and inequalities numerically, algebraically, and graphically
- Use matrices and linear programming to represent and solve problems
- Use matrices to represent and solve problems involving vertex-edge graphs
- Investigate the relationships between lines and circles
- Recognize, analyze, and graph the equations of conic sections
- Investigate planes and spheres
- Solve problems by interpreting a normal distribution as a probability distribution;
- Design and conduct experimental and observational studies

GPS Mathematics IV: Pre-Calculus-Trigonometry/Statistics

This is a fourth year mathematics course designed to prepare students for calculus and other college level mathematics courses. The course requires that students:

- Investigate and use rational functions
- Analyze and use trigonometric functions, their graphs, and their inverses
- Use trigonometric identities to solve problems and verify equivalence statements
- Solve trigonometric equations analytically and with technology
- Find areas of triangles using trigonometric relationships
- Use sequences and series
- Understand and use vectors
- Investigate the Central Limit theorem
- Use margins of error and confidence intervals to make inferences

Accelerated GPS Mathematics I: Geometry/Algebra II/Statistics

This is the first in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Represent and operate with complex numbers
- Explore the characteristics of basic functions utilizing tables, graphs, and simple algebraic techniques
- Operate with radical, polynomial, and rational expressions
- Solve equations, including quadratic, radical, and rational equations

- Investigate properties of geometric figures in the coordinate plane
- Use the language of mathematical argument and justification
- Discover, prove, and apply properties of polygons, circles and spheres
- Utilize counting techniques and determine probability
- Use summary statistics to compare sample data distributions and to relate sample statistics to corresponding population parameters
- Explore variability of data
- Fit curves to data and examine the issues related to curve fitting

Accelerated GPS Mathematics II: Advanced Algebra/Geometry/Statistics

This is the second in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Explore the characteristics of exponential, logarithmic, and higher degree polynomial functions using tables, graphs, and algebraic techniques
- Explore inverses of functions
- Use algebraic models to represent and explore real phenomena
- Solve a variety of equations and inequalities using numerical, graphical, and algebraic techniques with appropriate technology
- Use matrices to formulate and solve problems
- Use linear programming to solve problems
- Use matrices to represent and solve problems involving vertex-edge
- Use right triangle trigonometry to formulate and solve problems
- Investigate the relationships between lines and circles
- Recognize, analyze, and graph the equations of conic sections
- Investigate planes and spheres
- Use sample data to make informal inferences about population means and standard deviations
- Solve problems by interpreting a normal distribution as a probability distribution
- Design and conduct experimental and observational studies

Accelerated GPS Mathematics III: Pre-Calculus-Trigonometry/Statistics

This is the third in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Investigate and use rational functions
- Analyze and use trigonometric functions, their graphs, and their inverses
- Find areas of triangles using trigonometric relationships
- Use trigonometric identities to solve problems and verify equivalence statements
- Solve trigonometric equations analytically and with technology

- Use complex numbers in trigonometric form
- Understand and use vectors
- use sequences and series
- Explore parametric representations of plane curves
- Explore polar equations
- Investigate the Central Limit theorem
- Use margins of error and confidence intervals to make inferences

GPS High School Mathematics - Discrete Delivery System

GPS Algebra

This is the first in a sequence of mathematics courses designed to ensure that students are college and work ready. The course requires that students:

- Explore the characteristics of basic functions, utilizing tables, graphs, an d simple algebraic techniques
- Operate with radical, polynomial, and rational expressions
- Solve a variety of equations, including quadratic equations with leading coefficient of one, radical equations, and rational equations
- Represent and operate with complex numbers
- Use numerical, graphical, and algebraic techniques to explore quadratic, exponential, and piecewise functions and to solve quadratic, exponential and absolute value equations and inequalities
- Use algebraic models to represent and explore real phenomena
- Utilize counting techniques and determine probability
- Use summary statistics to compare samples to populations
- Explore the variability of data
- Fit curves to data and examine the issues related to curve fitting

GPS Geometry

This is the second in a sequence of mathematics courses designed to ensure that students are college and work ready. The course requires that students:

- Investigate properties of geometric figures in the coordinate plane
- use the language of mathematical argument and justification
- Discover, prove, and apply properties of polygons
- Explore inverses of functions
- Use right triangle trigonometry to formulate and solve problems
- Discover, justify, and use properties of circles and spheres
- Use sample data to make informal inferences about population means and standard deviations

GPS Advanced Algebra

This is the third in a sequence of mathematics courses designed to ensure that students are college and work ready. The course requires that students:

- Analyze polynomial functions of higher degree

- Explore logarithmic functions as inverses of exponential functions
- Solve a variety of equations and inequalities numerically, algebraically, and graphically
- Use matrices and linear programming to represent and solve problems
- Use matrices to represent and solve problems involving vertex-edge graphs
- Investigate the relationships between lines and circles

- Recognize, analyze, and graph the equations of conic sections
- Investigate planes and spheres
- Solve problems by interpreting a normal distribution as a probability distribution
- Design and conduct experimental and observational studies

GPS Pre-Calculus

This is a fourth year mathematics course designed to prepare students for calculus and other college level mathematics courses. The course requires that students:

- Investigate and use rational functions
- Analyze and use trigonometric functions, their graphs, and their inverses
- Use trigonometric identities to solve problems and verify equivalence statements
- Solve trigonometric equations analytically and with technology
- Find areas of triangles using trigonometric relationships
- Use sequences and series
- Understand and use vectors
- Investigate the Central Limit theorem
- Use margins of error and confidence intervals to make inferences

Accelerated GPS Algebra/Geometry

This is the first in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Represent and operate with complex numbers
- Explore the characteristics of basic functions utilizing tables, graphs, and simple algebraic techniques
- Operate with radical, polynomial, and rational expressions
- Solve equations, including quadratic, radical, and rational equations
- Investigate properties of geometric figures in the coordinate plane
- Use the language of mathematical argument and justification
- Discover, prove, and apply properties of polygons, circles and spheres
- Utilize counting techniques and determine probability
- Use summary statistics to compare sample data distributions and to relate sample statistics to corresponding population parameters
- Explore variability of data
- Fit curves to data and examine the issues related to curve fitting

Accelerated GPS Geometry/Advanced Algebra

This is the second in a sequence of mathematics courses designed to ensure that students are prepared to take higher level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Explore the characteristics of exponential, logarithmic, and higher degree polynomial functions using tables, graphs, and algebraic techniques
- Explore inverses of functions
- Use algebraic models to represent and explore real phenomena
- Solve a variety of equations and inequalities using numerical, graphical, and algebraic techniques with appropriate technology
- Use matrices to formulate and solve problems
- Use linear programming to solve problems
- Use matrices to represent and solve problems involving vertex-edge
- Use right triangle trigonometry to formulate and solve problems
- Investigate the relationships between lines and circles
- Recognize, analyze, and graph the equations of conic sections
- Investigate planes and spheres
- Use sample data to make informal inferences about population means and standard deviations
- Solve problems by interpreting a normal distribution as a probability distribution
- Design and conduct experimental and observational studies

Accelerated GPS Pre-Calculus

This is the third in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics. The course requires that students:

- Investigate and use rational functions
- Analyze and use trigonometric functions, their graphs, and their inverses
- Find areas of triangles using trigonometric relationships
- use trigonometric identities to solve problems and verify equivalence statements
- solve trigonometric equations analytically and with technology
- Use complex numbers in trigonometric form
- Understand and use vectors
- Use sequences and series
- Explore parametric representations of plane curves
- Explore polar equations
- Investigate the Central Limit theorem
- Use margins of error and confidence intervals to make inferences

Section 4: Student Placement in 2012-2013

I. Student Placement from Grade 8 GPS Mathematics to CCGPS Coordinate Algebra or Accelerated CCGPS Coordinate Algebra/Analytic Geometry A

Students who have successfully completed GPS mathematics in grades 6 – 8 have mastered the content necessary to be successful in CCGPS Coordinate Algebra or Accelerated CCGPS Coordinate Algebra/Analytic Geometry. Determination of course placement should depend on the student's interest in mathematics and/or related fields of study and on the student's achievement in mathematics. As the pace and rigor of accelerated mathematics courses is significantly more challenging than that of the regular mathematics sequence, students placed in an accelerated mathematics course should have strong mathematical skills and an interest in pursuing Advanced Placement or other higher-level mathematics courses while still in high school.

Students who will require additional support for success in CCGPS Coordinate Algebra are best served through placement in CCGPS Coordinate Algebra Support concurrent with enrollment in CCGPS Coordinate Algebra. Students should be enrolled in mathematics support courses based on local system criteria for identifying students who are at risk for failing mathematics. Students who are *placed* in high school and have not passed the grade 8 math CRCT should certainly be afforded the benefit of a support course. Other criteria might include teacher recommendation based on student performance in the previous or current mathematics course, prior retention, a failing grade in a mathematics course, and/or low scores on the mathematics component of the CRCT or other instruments used by the system to predict success.

Students who have earned high school mathematics credit by successfully completing GPS Mathematics I or GPS Mathematics II OR Accelerated GPS Mathematics I or Accelerated GPS Algebra in grade 8 during the 2011-2012 school year are best served by continuing the GPS delivery system in 2012-2013 by enrolling in GPS Mathematics II or GPS Geometry OR Accelerated GPS Mathematics II or Accelerated GPS Geometry.

Schools should consider equity and access for all when assigning students to accelerated mathematics courses. The CCGPS and GPS curricula provide the opportunity for students with an interest and desire to study mathematics to challenge themselves by taking more rigorous courses. Given the alignment of the standards, students who have difficulty in the accelerated mathematics sequences will be able to transition easily to the regular mathematics sequence.

The local school or system will determine the criteria for placing students in appropriate mathematics courses.

II. Student Placement for Students Transferring into Georgia Schools from Out-of-State Schools

Existing mathematics credits granted by out-of-state schools must be transferred as mathematics credit. Because the content of courses with similar names can vary significantly, it is crucial that the transcripts of students entering Georgia high schools with existing credit in high school mathematics courses be examined and that the students' mathematics proficiency be assessed.

Appropriate placement of students entering Georgia schools from other states or countries should be determined by careful examination of the students' transcripts and by individual student assessments. Students needing extensive remediation on middle grades topics should be placed in CCGPS Coordinate Algebra, along with CCGPS Coordinate Algebra Support.

Mathematics Graduation Requirement Guidance

for Students Entering Ninth Grade in 2012-2013

Chart C on pages 23-26 provides guidance for placing students entering with traditional mathematics course credit. In every case, students' transcripts should be carefully evaluated and assessments should be given. Students' interest and levels of achievement (grades) should also be considered when making a placement decision.

CHART C: Secondary Guidance for the 2012-2013 Placement of Transfer Students into Georgia Schools - Page 1

Grade At Transfer	With Credit for:	Course Sequence After Initial placement, each row shows the course pathway to follow. →			
		Grade 9 Placement	Grade 10 Placement	Grade 11 Placement	Grade 12 Placement
9	Algebra I	CCGPS Coordinate Algebra*	CCGPS Analytic Geometry	CCGPS Advanced Algebra	4th Course Option
		Accelerated CCGPS Coordinate Algebra/Analytic Geometry A*	Accelerated CCGPS Analytic Geometry B/Advanced Algebra	Accelerated CCGPS Pre-Calculus	
9	Algebra I and Geometry	CCGPS Coordinate Algebra*	CCGPS Analytic Geometry	CCGPS Advanced Algebra	4th Course Option
		Accelerated CCGPS Coordinate Algebra/Analytic Geometry A*	Accelerated CCGPS Analytic Geometry B/Advanced Algebra	Accelerated CCGPS Pre-Calculus	
9	Algebra I and Algebra II	CCGPS Analytic Geometry*	CCGPS Advanced Algebra	4thCourse Option	4th Course Option
		Accelerated CCGPS Coordinate Algebra/Analytic Geometry A*	Accelerated CCGPS Analytic Geometry B/Advanced Algebra	Accelerated CCGPS Pre-Calculus	
9	Algebra I, Geometry, and Algebra II	CCGPS Advanced Algebra*	4th Course Option	4th Course Option	4th Course Option
		Accelerated CCGPS Analytic Geometry B/Advanced Algebra*	Accelerated CCGPS Pre-Calculus		

*Placement in these courses is dependent upon assessment of student knowledge from the transfer school. Students should be evaluated by a mathematics instructor with a thorough understanding of the content. Because students who transfer from a traditional program may lack content knowledge from some strands (Algebra, Geometry, and Data Analysis) it is important to identify both strengths and weaknesses for each strand. After using the identified strengths to place the student in the appropriate course, identified Weaknesses should be used to prescribe supplementary lessons that address pre-requisite content knowledge. These lessons can be delivered through the Mathematics Support class or through independent work.

Mathematics Graduation Requirement Guidance

for Students Entering Ninth Grade in 2012-2013

CHART C: Secondary Guidance for the 2012-2013 Placement of Transfer Students into Georgia Schools – Page 2

Grade At Transfer	With Credit For:	Grade 10 Placement	Grade 11 Placement	Grade 12 Placement
10	Algebra I	GPS Mathematics I or GPS Algebra*	GPS Mathematics II or GPS Geometry	GPS Mathematics III or GPS Advanced Algebra**
		GPS Mathematics II or GPS Geometry*	GPS Mathematics III or GPS Advanced Algebra	4th Course Option
10	Algebra I and Geometry	GPS Mathematics II or GPS Geometry*	GPS Mathematics III or GPS Advanced Algebra	4th Course Option
		Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry*	Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced Algebra	Accelerated GPS Mathematics III or Accelerated GPS Pre-Calculus
10	Algebra I and Algebra II	GPS Mathematics II or GPS Geometry*	GPS Mathematics III or GPS Advanced Algebra	4th Course Option
		Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry*	Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced	Accelerated GPS Mathematics III or Accelerated GPS Pre-Calculus
10	Algebra I, Geometry, and Algebra II	GPS Mathematics III or GPS Advanced Algebra*	4th Course Option	4th Course Option
		Accelerated GPS Mathematics II or Accelerated GPS Geometry/Advanced Algebra*	Accelerated GPS Mathematics III or Accelerated GPS Pre-Calculus	

*Placement in these courses is dependent upon assessment of student knowledge from the transfer school. Students should be evaluated by a mathematics instructor with a thorough understanding of the content. Because students who transfer from a traditional program may lack content knowledge from some strands (Algebra, Geometry, and Data Analysis) it is important to identify both strengths and weaknesses for each strand. After using the identified strengths to place the student in the appropriate course, identified Weaknesses should be used to prescribe supplementary lessons that address pre-requisite content knowledge. These lessons can be delivered through the Mathematics Support class or through independent work.

**Students who complete the mathematics sequences only through GPS Mathematics III or GPS Advanced Algebra may have limited post- secondary options. Parents should be thoroughly advised of the consequences of their student graduating with only Mathematics I through III credit. During the advisement, fourth year mathematics options should be discussed and clarified, including summer courses, virtual courses, other available resources.

CHART C: Secondary Guidance for the 2012-2013 Placement of Transfer Students into Georgia Schools – Page 3

Grade At Transfer	With Credit For:	Grade 11 Placement	Grade 12 Placement
11	Algebra I	Mathematics I or GPS Algebra*	Mathematics II or GPS Geometry**
		Mathematics II or GPS Geometry*	Mathematics III or GPS Advanced Algebra**
11	Algebra I and Geometry	Mathematics II or GPS Geometry*	Mathematics III or GPS Advanced Algebra**
11	Algebra I, Geometry, and Algebra II	Mathematics III or GPS Advanced Algebra*	4th Course Option
		Accelerated Mathematics II or Accelerated GPS Geometry/Advanced Algebra*	Accelerated Mathematics III or Accelerated GPS Pre-Calculus
12	Algebra I and Geometry		Mathematics II or GPS Geometry***
			Mathematics III or GPS Advanced Algebra***
12	Algebra I and Algebra II		Mathematics II or GPS Geometry***
			Mathematics III or GPS Advanced Algebra***
12	Algebra I, Geometry, and Algebra II		Mathematics III or GPS Advanced Algebra***
			4th Course Option*
12	Algebra I, Geometry, Algebra II and Pre-Calculus		4th Course Option

*Placement in these courses is dependent upon assessment of student knowledge from the transfer school. Students should be evaluated by a mathematics instructor with a thorough understanding of the content. Because students who transfer from a traditional program may lack content knowledge from some strands (Algebra, Geometry, and Data Analysis) it is important to identify both strengths and weaknesses for each strand. After using the identified strengths to place the student in the appropriate course, identified Weaknesses should be used to prescribe supplementary lessons that address pre-requisite content knowledge. These lessons can be delivered through the Mathematics Support class or through independent work.

**Students who complete the mathematics sequences only through GPS Mathematics III or GPS Advanced Algebra may have limited post- secondary options. Parents should be thoroughly advised of the consequences of their student graduating with only Mathematics I through III credit. During the advisement, fourth year mathematics options should be discussed and clarified, including summer courses, virtual courses, other available resources.

CHART C: Secondary Guidance for the 2012-2013 Placement of Transfer Students into Georgia Schools – Page 4

Transfer Credit

Pursuant to State Board of Education Rule 160-5-1-.15 section (2)(a)," Local boards of education shall accept student course credit earned in an accredited school." In paragraph (2)(a)1, "A local board of education shall not substitute courses and exempt students from the required secondary minimum core curriculum…unless the student transferred from an accredited secondary school…".

Military Transfer Law

In 2009, O.C.G.A. § 20-2-2130 through 20-2-2170 which pertain to the transfer and placement of children of military families in Georgia public schools were added to Georgia State Law. Among other provisions, the law requires that the local school system shall initially honor placement of the student in educational courses based on the student's enrollment in the sending state school or educational assessments conducted at the school in the sending state, if the courses are offered. Course placement includes but is not limited to honors, international baccalaureate, advanced placement, vocational, technical, and career pathways courses. Continuing the student's academic program from the previous school and promoting placement in academically and career challenging courses should be paramount when considering placement. Additionally, local school systems shall have flexibility in waiving course or program prerequisites or other preconditions for placement in courses and programs offered by the local school system.

Course Numbers

Students who move into Georgia with Algebra I, Geometry, or Algebra II credit shall receive transfer credit. We will not add the following numbers to State Board of Education Rule 160-4-2-.20 [IDA(3)] since they cannot be used as active classes in the school day, but only for the recording of transfer credit. Please use the following course numbers to award transfer credit:

27.03400 Transfer Algebra I (1st year if taught over 2 years)
27.03500 Transfer Algebra I (2nd year if taught over 2 years or if taught in 1 year)
27.03600 Transfer Geometry
27.03700 Transfer Algebra II

III. Student Placement for Students Transferring out of Georgia Schools

Content descriptions for all completed GPS mathematics courses need to accompany students transferring out of Georgia schools.

Chart D indicates **possible** placement from GPS Mathematics courses into traditional courses similar to those that existed under the Quality Core Curriculum.

CHART D: Secondary Guidance for the 2012-2013 Placement of Transfer Students out of Georgia Schools

Completed GPS Courses	Possible Placement
GPS Grade 8 Math	Algebra I
GPS Mathematics I or GPS Algebra	Geometry or Algebra II
Accelerated GPS Mathematics I or Accelerated GPS Algebra/Geometry	Honors Algebra II or Pre-Calculus
Mathematics II or GPS Geometry	Algebra II or Advanced Algebra and Trigonometry
Accelerated Mathematics II or Accelerated GPS Geometry/Advanced Algebra	Pre-Calculus, Advanced Algebra and Trigonometry, AP Statistics
Mathematics III or GPS Advanced Algebra	Advanced Algebra and Trigonometry, Pre-Calculus, AP Statistics, Discrete Mathematics
Accelerated Mathematics III or Accelerated GPS Pre-Calculus	AP Calculus AB, AP Calculus BC, AP Statistics, Discrete Mathematics

IV. Student Placement for Students Transferring within Georgia Schools

Students who are transferring from a Georgia school system utilizing an integrated delivery system to a Georgia school system utilizing discrete delivery system or from a discrete delivery system to an integrated delivery system **after successfully completing the first course in the delivery system sequence** will benefit from study of the units within the GPS Transition Frameworks which are posted on the GaDOE Mathematics Program Webpage at: http://public.doe.k12.ga.us/ci_services.aspx?PageReq=CIServMath.

GPS Mathematics I to GPS Geometry
Students who are transitioning from GPS Mathematics I to GPS Geometry will be missing critical content from GPS Algebra. The Transition Packet: Mathematics I to GPS Geometry document provides the content in both web-based and print formats. The standards are the same in either format.

GPS Algebra to GPS Mathematics II
Students who are transitioning from GPS Algebra to GPS Mathematics II will be missing content from GPS Mathematics I, mainly content dealing with geometry. The Transition Packet: GPS Algebra to Mathematics II provides the content in both web-based and print formats. The standards are the same in either format.

It is important to note that the standards addressed in the following course matches are identical. However, the standards are not necessarily addressed within the courses in the same order as indicated below.

GPS Advanced Algebra	and	GPS Mathematics III
GPS Pre-Calculus	and	GPS Mathematics IV
Accelerated GPS Algebra/Geometry (Units sorted differently within the courses)	and	Accelerated GPS Mathematics I
Accelerated GPS Geometry/Advanced Algebra (Units sorted differently within the courses)	and	Accelerated GPS Mathematics II
Accelerated GPS Pre-Calculus	and	Accelerated Mathematics III

Section 6: Mathematics Support Course Guidance

Purpose: The purpose of the mathematics support courses is to address the needs of students who have traditionally struggled in mathematics by providing the additional time and attention they need in order to successfully complete their core academic mathematics course without failing.

Mathematics support courses should be taught concurrently with a student's core academic mathematics course. Additional elective credit can be given for mathematics support courses if students retake core academic mathematics courses in which they were not initially successful and choose to retake the associated support course.

NOTE:
Districts have been given the flexibility of awarding core credit for mathematics support courses for students who entered ninth grade only in school years 2008-2009, 2009-2010, and 2010-2011.
Mathematics Support III and GPS Advanced Algebra Support can be taught as stand-alone core courses only for students who entered ninth grade in the school years 2008-2009, 2009-2010, and 2010-2011.
The Board of Regents of the University System of Georgia will consider admissions into the USG institutions for 2012 and 2013 graduates who successfully complete Mathematics Support III or GPS Advanced Algebra in 2010-2011 or 2011-2012, along with GPS Mathematics I or GPS Algebra, GPS Mathematics II or GPS Geometry, and GPS Mathematics III or GPS Advanced Algebra.

How should students be selected to be enrolled in a mathematics support course?

Students should be enrolled in mathematics support courses based on local system criteria for identifying students who are at risk for failing mathematics. Students who are *placed* in high school and have not passed the grade 8 math CRCT should certainly be afforded the benefit of a support course. Other criteria might include teacher recommendation based on student performance in the previous or current mathematics course, prior retention, a failing grade in a mathematics course, and/or low scores on the mathematics component of the CRCT, mathematics EOCT, or other instruments used by the system to predict success.

Who should teach this course?

The course should be taught by a certified mathematics teacher, preferably one with experience in differentiating instruction to meet the needs of struggling students. If English Learners are being served in a mathematics support course, it is recommended that the teacher also hold the ESOL endorsement. The mathematics support teacher should work closely with the teacher(s) teaching the associated core mathematics course to align content, instruction, and assessments.

How important is collaboration among teachers to the success of students enrolled in mathematics support courses?

Teachers of the mathematics support courses and the academic core mathematics courses, including collaborative English Learner (EL) and special education teachers, share the responsibility for students' mathematical achievement. In fact, all teachers who instruct students who are enrolled in mathematics support courses should consistently and frequently engage in communication which focuses on:

- individual student progress, including grades, strengths and weaknesses based on standards, mathematical disposition, and work habits;
- curriculum expectations, including specific standards to be addressed based on a timeline, prerequisite skills, vocabulary, and potential misconceptions;
- instructional strategies, including specific strategies for teaching math concepts that are being used in both classrooms to provide consistency and understanding for teachers and students; and
- differentiation of instruction, including tasks based on the *ACCESS* for *ELs* Composite Proficiency Levels of ELs and the WIDA standards for English Learners; and
- assessments, including content and formats that are being used to evaluate students for specific standards.

- What are the critical components of a mathematics support course?

- All students in a particular mathematics support course should be enrolled in the same core academic mathematics course. (i.e. students enrolled in CCGPS Coordinate Algebra Support will **all** be enrolled in CCGPS Coordinate Algebra as well).
- The mathematics support course should focus on mastery of the standards being taught in the associated core academic mathematics course, and not on general content from elementary or middle school.
- Grading practices should emphasize mastery of standards through the frequent use of aligned quizzes and tests, both formative and summative.
- Continual progress monitoring should be used to assess and diagnose each student's strengths and weaknesses, based on the standards of the associated core academic mathematics course, and to provide appropriate interventions.
- Opportunities should be provided for students to review content with a focus on standards not previously mastered.
- Opportunities should be provided for students to preview the mathematical concepts associated with the core academic mathematics course. In the support course, attention needs to be given to prerequisite skills and concepts and to the vocabulary of the current course.
- The academic language of mathematics should be explicitly taught as concepts are introduced and reinforced.
- Proven strategies for success in mathematics should be utilized on a daily basis. Students should be engaged in *doing* mathematics, explaining their thinking, and justifying their work. Multiple representations of concepts (tables, charts, graphs, verbal descriptions) should be used as often as possible.
- There should be strong emphasis on building a positive disposition toward learning mathematics.
- Although there is no class size requirement for the mathematics support courses, a reduced class size is recommended.

How will students be evaluated in mathematics support courses?

The goal of a mathematics support course is to assist students in the successful completion of the associated core academic mathematics course. Assignments, quizzes and tests should be aligned to the standards being taught in the core academic course. Individuals should be given multiple opportunities to show mastery of the content, including opportunities to demonstrate mastery of material first addressed in the associated core academic mathematics course. Mathematics support provides the time some students need for additional practice or re-testing. The value of formative assessment and feedback cannot be overstated. Continuous progress monitoring with both feedback and commentary is essential in this course. Students should not feel pressure to "make grades" in this class as much as they should be motivated and encouraged to master standards. Documented continuous communication with students on an individual basis is the most appropriate way to maintain records of progress. Remedial Education Program (REP) assessment processes may be appropriate models.

How much credit is awarded for one mathematics support course?

One unit of elective credit is earned for the successful completion of this course for students entering ninth grade in 2011-2012 and 2012-2013. Districts will designate whether students who entered ninth grade in the school years 2008-2009, 2009-2010, and 2010-2011 will receive one unit of core or elective credit for successful completion of mathematics support courses.

How is this course different from the Remedial Education Program (REP)?

The focus of the mathematics support course is to provide very specific support for the high school core academic mathematics course in which a student is currently enrolled. The Remedial Education Program is an instructional program designed for students in grades 6-12 who have identified deficiencies in reading, writing, and math. However, REP funding can be used for the mathematics support class, if REP guidelines for eligibility, scheduling, and class size are followed.

If a school is on a 4x4 block schedule, does this mean that students must have mathematics for two blocks during the school day?

It is important that the mathematics support course be taught concurrently with the associated core academic mathematics course. However, scheduling options that keep struggling students engaged in mathematics throughout the school year are generally preferable to two blocks each day for a semester. A hybrid scheduling model might address these issues, allowing for continuous yearlong support without requiring that two of the student's four semester blocks be devoted to mathematics.

Section 7: Resources Available to Middle School and High School Counselors

- Sandi Woodall, Mathematics Program Coordinator
  swoodall@doe.k12.ga.us; 404.463.1736

- GaDOE Mathematics Program Webpage at:

http://public.doe.k12.ga.us/ci_services.aspx?PageReq=CIServMath

- GaDOE georgiastandards.org CCGPS Mathematics Website at:
  https://www.georgiastandards.org/Common-Core/Pages/Math.aspx