

Regents Approved Commencement level Mathematics Course Descriptions

The three new high school mathematics courses (Integrated Algebra, Geometry, Algebra & Trigonometry) are built around five process strands: Problem Solving, Reasoning and Proof, Communication, Connections, and Representation as well as five content strands: Number Sense and Operations, Algebra, Geometry, Measurement, and Statistics and Probability. Within these courses, students will be expected to make connections between the verbal, numerical, algebraic, and geometric representations of problem situations. These courses will require students to apply and adapt a selection of strategies and algorithms to solve a variety of problems. It is expected that these strategies and algorithms will be implemented using both traditional and technological tools. A brief description of the three courses follows.

On December 8, 2005 the Board of Regents unanimously approved the Education Department's recommended [implementation timeline](#) for the Regents Examinations in Integrated Algebra, Geometry, and Algebra 2 and Trigonometry.

Integrated Algebra is the first mathematics course in the high school. The integrated algebra course set forth here is not the algebra of 30 years ago. The focal point of this course is the algebra content strand. Algebra provides tools and ways of thinking that are necessary for solving problems in a wide variety of disciplines, such as science, business, social sciences, fine arts, and technology. This course will assist students in developing skills and processes to be applied using a variety of techniques to successfully solve problems in a variety of settings. Problem situations may result in all types of linear equations in one variable, quadratic functions with integral coefficients and roots as well as absolute value and exponential functions. Coordinate geometry will be integrated into the investigation of these functions allowing students to make connections between their analytical and geometrical representations. Problem situations resulting in systems of equations will also be presented. Alternative solution methods should be given equal value within the strategies used for problem solving. For example, a matrix solution to a system of equations is just as valid as a graphical solution or an algebraic algorithm such as elimination. Measurement within a problem-solving context will include calculating rates using appropriate units and converting within measurement systems. Data analysis including measures of central tendency and visual representations of data will be studied. An understanding of correlation and causation will be developed and reasonable lines of best fit will be used to make predictions. Students will solve problem situations requiring right triangle trigonometry. Elementary probability theory will be used to determine the probability of events including independent, dependent and mutually exclusive events.

Geometry is intended to be the second course in mathematics for high school students. There is no other school mathematics course that offers students the opportunity to act as mathematicians. Within this course, students will have the opportunity to make conjectures about geometric situations and prove in a variety of ways, both formal and informal, that their conclusion follows logically from their hypothesis. This course is meant to employ an integrated approach to the study of geometric relationships. Integrating synthetic, transformational, and coordinate approaches to geometry, students will justify geometric relationships and properties of geometric figures. Congruence and similarity of triangles will be established using appropriate theorems. Transformations including rotations, reflections, translations, and glide reflections and coordinate geometry will be used to establish and verify geometric relationships. A major emphasis of this course is to allow students to investigate geometric situations. Properties of triangles, quadrilaterals, and circles should receive particular attention. It is intended that students will use the traditional tools of compass and straightedge as well as dynamic geometry software that models these tools more efficiently and accurately, to assist in these investigations. Geometry is meant to lead students to an understanding that reasoning and proof are fundamental aspects of mathematics and something that sets it apart from the other sciences.

Algebra 2 and Trigonometry is the capstone course of the three units of credit required for a Regents diploma. This course is a continuation and extension of the two courses that preceded it. While developing the algebraic techniques that will be required of those students that continue their study of mathematics, this course is also intended to continue developing alternative solution strategies and algorithms. For example, technology can provide to many students the means to address a problem situation to which they might not otherwise have access. Within this course, the number system will be extended to include imaginary and complex numbers. The families of functions to be studied will include polynomial, absolute value, radical, trigonometric, exponential, and logarithmic functions. Problem situations involving direct and indirect variation will be solved. Problems resulting in systems of equations will be solved graphically and algebraically. Algebraic techniques will be developed to facilitate rewriting mathematical expressions into multiple equivalent forms. Data analysis will be extended to include measures of dispersion and the analysis of regression that model functions studied throughout this course. Associated correlation coefficients will be determined, using technology tools and interpreted as a measure of strength of the relationship. Arithmetic and geometric sequences will be expressed in multiple forms, and arithmetic and geometric series will be evaluated. Binomial experiments will provide the basis for the study of probability theory and the normal probability distribution will be analyzed and used as an approximation for these binomial experiments. Right triangle trigonometry will be expanded to include the investigation of circular functions. Problem situations requiring the use of trigonometric equations and identities will also be investigated.