

# Advanced Algebra With Trigonometry

Content Area: **Math**  
Course(s): **ADVANCED ALGEBRA WITH TRIGONOMETRY**  
Time Period:  
Length: **Full Year**  
Status: **Published**

## Cover

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### **EAST BRUNSWICK PUBLIC SCHOOLS**

**East Brunswick New Jersey**

**Superintendent of Schools**

Dr. Victor P. Valeski

**Mathematics**

**Advanced Algebra With Trigonometry-Course Number: 1158**

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**Course Adoption:** 4/21/1986

**Curriculum Adoption:** 11/2/17

**Date of Last Revision Adoption:** 9/1/2017

## **Course Overview**

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### **COURSE DESCRIPTION:**

This course includes a review of essential skills from algebra, introduces polynomial, rational, exponential and logarithmic functions, and gives the student an in-depth study of trigonometric functions and their applications. Modern technology provides tools for supplementing the traditional focus on algebraic procedures, such as solving equations, with a more visual perspective, with graphs of equations displayed on a screen. Students can then focus on understanding the relationship between the equation and the graph, and on what the graph represents in a real-life situation. The focus of the course will center around the ability to graph functions and understand and describe the general behavior of functions.

## **Textbooks and other resources**

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**Textbook:** Algebra and Trigonometry: An Early Functions Approach, Robert F. Blitzer; Prentice Hall, copyright 2007,

adopted 6/15/2006



## Scope and Sequence

Sequential Unit Description	Marking Period guide	Other Pacing Guide References	Proficiency Summative Assessments
<p style="text-align: center;"><b>Unit 1 – Algebra Review</b></p> <p>In this unit students will explore fundamental concepts of algebra. They will work towards mastery of algebra topics such as simplifying an expression with multiple variables, factoring polynomials of varying degree, simplifying radicals, and applying rules of exponents.</p> <p>Students will perform basic operations on rational expressions, including addition, subtraction, multiplication and division and simplify the result. Using these operations, students will find solutions to rational equations and determine valid solutions. Students will make a connection between valid solutions and restrictions on the defined values of <math>x</math> for a given rational expression. Students will simplify complex fractions using a method of their choice. No emphasis will be placed on graphing of rational functions.</p>	1	35 days	Exit Cards Performance Assessments Quizzes Chapter Tests
<p style="text-align: center;"><b>Unit 2 – Introduction to Trigonometry</b></p> <p>In this unit, the students will build upon foundational geometric and trigonometric knowledge that has previously been covered in their Geometry with Trigonometry course. Formal terms, vocabulary and relationships will be reviewed and introduced as a framework and basis for the entire section. Using the Pythagorean Theorem and the student's ability to use formulas to solve problems, students will explore the six trigonometric functions, first in acute angles in Quadrant I and then for any angle in standard position. Students will develop a fluency for degree measures, as well as, the basic reference angles and their respective side ratios. Students will be introduced to radian measure, convert between degrees and radians, draw angles in standard position, and find coterminal angles.</p> <p>Students will then take the relationships that exist between the six trig functions and the Pythagorean Theorem to demonstrate the Pythagorean Identity using numerous Pythagorean triples.</p>	1 and 2	35 days	Exit Cards Performance Assessments Quizzes Chapter Tests
<p style="text-align: center;"><b>Unit 3 – Graphs of Trigonometric Functions</b></p> <p>In this unit, students will understand and graph variations of <math>y=\sin x</math>, <math>y=\cos x</math>, <math>y=\tan x</math>, and <math>y=\cot x</math>. They will also use vertical shifts of sine, cosine, tangent, and cotangent curves and model periodic behavior. Students will use their acquired knowledge of sine and cosine curves to graph variations of the reciprocal functions <math>y=\csc x</math> and <math>y=\sec x</math>. Students will use the graphs to analyze relationships between the equation of a graph and its characteristics such as period, amplitude, stretches and shrinks.</p> <p>Students will understand and use the inverse sine, cosine, and tangent functions. Students will use a calculator to evaluate inverse trigonometric functions and</p>	2 and 3	30 days	Exit Cards Performance Assessments Quizzes Unit Tests

find exact values of composite functions with inverse trigonometric functions using the Unit Circle.			
<p align="center"><b>Unit 4 – Verifying and Evaluating Trig Expressions</b></p> <p>In this unit, the students will use the fundamental trigonometric identities to verify and prove trig identities and relationships. Further, they will use sum and difference formulas, double angle formulas and half-angle formulas for sine, cosine, and tangent. The simplification of these expressions will enable students to evaluate trig functions using the Unit Circle.</p>	3	25 days	Exit Cards Performance Assessments Quizzes Unit Tests
<p align="center"><b>Unit 5 – Additional Topics in Trigonometry</b></p> <p>Students will find all solutions of trigonometric equations, and also, solutions on the interval <math>[0, 2\pi)</math>. Specifically, students will use algebra skills to solve trigonometric equations in quadratic form and use factoring to apply the Zero Product Property.</p> <p>Students will use the Law of Sines and the Law of Cosines to solve oblique triangles. Students will find the area of an oblique triangle using the sine function and Heron's Formula. Further, students will use methods of solving oblique triangles to solve application problems.</p>	3 and 4	15 days	Exit Cards Performance Assessments Quizzes Unit Tests
<p align="center"><b>Unit 6 – Logarithmic Expressions and Equations</b></p> <p>In this unit, the students will build upon previous knowledge of rules of exponents to use and understand properties of logarithms. Students will change from logarithmic to exponential form and vice versa, evaluate logarithms, and use basic logarithmic properties such as product, quotient, and power rules. They will expand and condense logarithmic expressions, as well as use the change of base property.</p> <p>Students will use like bases and logarithms to solve exponential equations, use the definition of logarithms to solve logarithmic equations, and use the one-to-one property of logarithms to solve logarithmic equations.</p>	4	10 days	Exit Cards Performance Assessments Quizzes Chapter Tests

## Standards for Mathematical Practices

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MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.

MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

## **Grading and Evaluation Guidelines**

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### **GRADING GUIDELINES:**

As per Math Department Policy, grades will be determined by a variety of assessment strategies, including Major Assessments, Minor Assessments, and Performance Assessments. In addition to tests and quizzes, students will be evaluated on a combination of performance assessment instruments, including homework completions, cooperative group participation, note-taking, open ended question responses, lab reports and/or supplemental projects.

### **GRADING PROCEDURES:**

Grading procedures must be described in sufficient detail so that a pupil will understand, the minimal to advanced proficiency, expected of him/her as the outcome of each unit, for the marking period and for the course as a whole. Benchmark level assessments associated with the course also need to be identified. While assessments of proficiency levels must be valid and reliable they do not need be the same for all students.

Other criteria to be considered in grading must be identified and the degree to which such criteria will be considered in a grade. Each pupil must receive a copy of the grading procedures, proficiencies and criteria for each unit and/or marking period.

### **COURSE EVALUATION:**

Course achievement will be evaluated as the percent of all pupils who achieve the minimum level of proficiency (final average grade) in the course. Student achievement levels above minimum proficiency will also be reported. Final grades, and where relevant mid-term and final exams, will be analyzed by staff for the total cohort and for sub-groups of students to determine course areas requiring greater support or modification.

**In terms of proficiency the East Brunswick grades are as follows:**

<b>A</b>	<b>Excellent</b>	<b>Advanced Proficient</b>
<b>B</b>	<b>Good</b>	<b>Above Average Proficient</b>
<b>C</b>	<b>Fair</b>	<b>Proficient</b>
<b>D</b>	<b>Poor</b>	<b>Minimally Proficient</b>

<b>F</b>	<b>Failing</b>	<b>Partially Proficient</b>
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In this course the goal is that a minimum of 95% of the pupil's will meet at least the minimum proficiency level (D or better) set for the course. The department will analyze the achievement of students on Unit Assessments, Mid-term and Final Exams and Final Course Grades, and for Final Course Grades the achievement of sub-groups identified by the state to determine if modifications in the curriculum and instructional methods are needed.

<b>Course evaluation requires the answering of the following questions:</b>
<ol style="list-style-type: none"><li>1. Are course content, instruction and assessments aligned with the required NJSLs?</li><li>2. Is instruction sufficient for students to achieve the Standards?</li><li>3. Do all students achieve the set proficiencies/benchmarks set for the course?</li></ol>

**Other Details**

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**SCED**

**02106 Advanced Algebra with Trigonometry**

Trigonometry/Algebra courses combine trigonometry and advanced algebra topics, and are usually intended for students who have attained Algebra I and Geometry objectives. Topics typically include right trigonometric and circular functions, inverses, and graphs; trigonometric identities and equations; solutions of right and oblique triangles; complex numbers; numerical tables; field properties and theorems; set theory; operations with rational and irrational expressions; factoring of rational expressions; in-depth study of linear equations and inequalities; quadratic equations; solving systems of linear and quadratic equations; graphing of constant, linear, and quadratic equations; and properties of higher degree equations.