Pre-Calculus Honors Course Overview

Content Area: **Math**
Course(s): **PRE CALC H**
Time Period:
Length: **Full Year**
Status: **Published**

Cover

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Course Adoption: 4/21/1986

Curriculum Adoption: 11/2/2017

Date of Last Revision Adoption: 9/1/2017

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Course Overview
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 and behavior of the function, in preparation for the advanced study of calculus. Students further explore functions in real-life situations, including science, economics, biology and navigation. The focus of the course will be twofold. First, students will be able to understand and describe the general behavior of functions, including transcendental functions, and secondly, to develop an in depth understanding of trigonometry and its applications.

Textbooks and other resources
Textbook: PreCalculus with Limits 5th Edition; R. Larson & R. Hostetler; Houghton Mifflin; copyright 2007
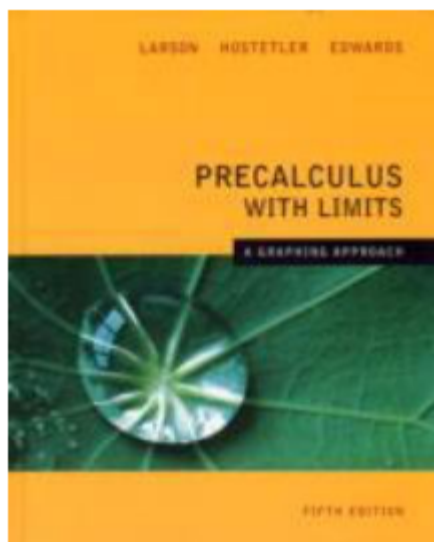
TI-83 or TI-84 graphing calculator is required for this course

Scope and Sequence

Sequential Unit Description:	Marking Period Guide	Other Pacing Guide References	Proficiency (Summative) Assessments
Unit 1 Students will review functions and their representations in the Cartesian plane, finding slopes and writing equations of lines along with transformations of commonly used parent functions. Students will also continue to explore composition of more than one funcion, the inverse fo a function and the use of functions in modeling real-world data.	1	Text Chapter 1 7 days	**Formative Assessments** **Group/Lab Activity** **Quiz** **Test**
Unit 2 Students will review graphs of linear, quadratic and other polynomial functions. They will explore polynomial functions and apply the Leading Coefficient Test, Fundamental Theorem of Calculus, Remainder Theorem to identify key characteristics including domain, range, extrema, intercepts and increasing and decreasing intervals. They will graph rational functions using asymptotes, intercepts, and holes and identify domain and range for these functions.	1	Text Chapter 2 12 days	**Formative Assessments** **Quiz/Test**
Unit 3 Students will write and graph an exponential and logarithmic functions and identify their key features (including domain and range). They will they expand their skills using the properties of logarithms and exponents to manipulate expressions and solve equations. They will use these functions to model real life situations and solve real-world problems.	1	Text Chapter 3 10 days	**Formative Assessments** **Quiz/Test**

Unit			
Unit 4 Students will define and evaluate trigonometric functions of all angles using right triangle trigonometry, unit circles and reference angles. They will use trigonometric functions to solve triangles.	1/2	**Text Chapter 4** Sections 1-4 14 days	**Formative Assessments** Quiz(es) Test
Unit 5 Students will sketch the graphs of trigonometric functions, including sine, cosine, tangent, co-tangent, secant, cosecant and inverse trigonometric functions. Students will identify key characteristics of the graphs of these functions (including any asymptotes, domain and range) and solve real life problems.	2	**Text Chapter 4** Sections 5-8 21 days	**Formative Assessments** Group Assignment Quiz(es) Test
Unit 6 Students will verify trigonometric identities. They will solve trigonometric equations and evaluate trigonometric functions using trigonometric identities. They will expand these concepts to solve more complicated equations including sums and differences of angles, multiple angles and half angles.	2	**Text** **Chapter 5** 15 days	**Formative Assessments** Quiz(es) Test Midterm
Unit 7 Students will use Law of Sines and Law of Cosines to solve and find areas of oblique triangles. Students will represent and perform operations with vectors. Students will perform operations on complex numbers using trigonometry. Students will apply these concepts to real life problems.	3	**Text** **Chapter 6** 24 days	**Formative Assessments** Quiz(es) Test
Unit 8 Students will perform operations on matrices and use matrices to solve systems of equations and apply to real life problems.	3	**Text Chapter 7** 4 days	**Formative Assessments** Group Activity Quiz(es) Test
Unit 9 Students will explore sequences and series, including arithmetic and geometric series. Students will apply the binomial theorem. Students will use the Fundamental Counting Principle, combinations and permutations to solve real problems. Students will determine the probabilities of multiple events.	3	**Text Chapter 8** 19 days	**Formative Assessments** Quiz(es) Test
Unit 10 Students will write conic sections in standard form and graph them in the coordinate plane. Students will write and graph parametric and polar equations.	4	**Text Chapter 9** 13 days	**Formative Assessments** Quiz(es) Test
Unit 11 Students will evaluate and interpret the limit of a function. Students will use the concept of limit to approximate slopes and approximate areas.	4	**Text Chapter 11** 18 days	**Formative Assessments** Quiz(es) Test

NJ Student learning Standards

MA.F-TF.A.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
MA.F-TF.A.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
MA.F-TF.A.3	Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosines, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x, where x is any real number.
MA.F-TF.A.4	Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.
MA.F-TF.B.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.
MA.F-TF.B.6	Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
MA.F-TF.B.7	Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.
MA.F-TF.C.8	Prove the Pythagorean identity $sin^2(\theta) + cos^2(\theta) = 1$ and use it to find $sin(\theta)$, $cos(\theta)$, or $tan(\theta)$ given $sin(\theta)$, $cos(\theta)$, or $tan(\theta)$ and the quadrant of the angle.
MA.F-TF.C.9	Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

Standards for Mathematical Practices

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

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:

A	Excellent	Advanced Proficient
B	Good	Above Average Proficient
C	Fair	Proficient
D	Poor	Minimally Proficient
F	Failing	Partially Proficient

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.

Other Details

SCED

02110 Pre-Calculus

This courses combines the study of Trigonometry, Elementary Functions, Analytic Geometry, and Math Analysis topics as preparation for calculus. Topics typically include the study of complex numbers; polynomial, logarithmic, exponential, rational, right trigonometric, and circular functions, and their relations, inverses and graphs; trigonometric identities and equations; solutions of right and oblique triangles; vectors; the polar coordinate system; conic sections; Boolean algebra and symbolic logic; mathematical induction; matrix algebra; sequences and series; and limits and continuity.