

# Course Syllabus

## Mathematics, Pre-Calculus

Jefferson County Schools Curriculum, Final  
Jefferson County Schools

The Terra Nova Complete Battery for Mathematics is "designed to help students show what they know and can do. Many questions call for critical thinking, reasoning, and problem solving. Questions allow students to use different strategies and to take individual paths to a solution. Real-world topics engage students' interest, and the extensive use of graphics reduces the need for explanatory text and provides a supportive context. Themes group items into meaningful configurations, and items are generally sequenced to promote initial success so that students will continue with confidence to more challenging questions.

The [Terra Nova] tests taps broad mathematical power, yet retains the specifics from the traditional curriculum. The first section of the test includes computation, computation in context, and estimation items, and is administered without calculators. The second section covers a broad range of core skills and may be administered with calculators. Some questions require the use of rulers, which are supplied with the testing materials."

The Tennessee Mathematics Curriculum Standards provide standards, performance indicators, and accomplishments for students in mathematics.

The Tennessee Mathematics Framework for grades 9 through 12 outlines skills to be taught in Pre-Calculus.

### Algebraic Concepts

- The learner will be able to obtain solutions to inequalities applying an appropriate technology.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44

### Calculus and Pre-Calculus

- The learner will be able to use equations and graphs of conic sections to represent real world phenomena.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 46
- The learner will be able to apply the trigonometric form of complex numbers.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45

- The learner will be able to determine powers and roots of complex numbers by using DeMoivre's theorem.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to prove DeMoivre's theorem.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to present the idea of a limit of a function.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to use the limit of a function to determine the slope of a line tangent to a curve.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to use limits to build on the concept of continuity.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to understand vectors in real world problem solving.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to solve real world problems using vectors.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45

### Functions

- The learner will be able to solve for the values of inverse trigonometric functions and apply appropriate domain and range restrictions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to sketch graphs of the six trigonometric functions involving period change, amplitude change, phase shift, and/or vertical shift.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45

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- The learner will be able to identify and use mathematical representations of linear, quadratic, exponential, logarithmic, and trigonometric functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to give definitions of six circular functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to identify a logarithmic as the inverse of an exponential function.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to graph both exponential and logarithmic functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to apply the inverse relationship of exponential and logarithmic functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to obtain solutions to exponential and logarithmic equations representing real world problems.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to apply the trigonometric functions to model periodic phenomena.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to sketch graphs of the basic functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to create graphs of transformations and combinations of transformations for all the basic functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to find an equation of a rational function using a written description.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to identify odd and even functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to interpret functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to analyze a function by decomposing it into simpler functions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44

### Measurement

- The learner will be able to devise and use formulas for the area of a triangle.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45

### Numeration

- The learner will be able to illustrate an understanding of sequences by representing them recursively and explicitly.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to show a series in correct sigma notation.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to determine the sum of an infinite geometric series.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to determine the sum of an infinite series that converge.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45

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- The learner will be able to determine whether a given series converges or diverges.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45

### Probability/Statistics

- The learner will be able to apply models when suitable to draw conclusions or formulate predictions.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to use strategies of data analysis to model real world phenomena.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44
- The learner will be able to apply scatterplot residuals, and/or correlation coefficients to identify whether a model is appropriate.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44

### Problem Solving

- The learner will be able to explore problems individually or in cooperative groups.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44

### Technology

- The learner will be able to appropriately use technology to solve problems.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 44

### Trigonometry

- The learner will be able to develop and confirm trigonometric identities using graphs.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to solve trigonometric equations and inequalities algebraically or with automatic grapher.  
Source: TN: Curriculum Framework (9-12), January

30, 1998, Pre-Calculus, p. 45

- The learner will be able to devise and use formulas for the sector of a circle.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to derive the Law of Sines and Cosines and use them to obtain solutions to problems involving triangles and vectors.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to comprehend the relationship between measure in radians and degrees.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to use radian measures in problems associated with linear and angular velocity.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45
- The learner will be able to convert complex numbers between polar and rectangular form.  
Source: TN: Curriculum Framework (9-12), January 30, 1998, Pre-Calculus, p. 45