Course Syllabus
Mathematics, 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 Calculus.

Algebraic Concepts

- The learner will be able to illustrate rates of change, including associated rates problems.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50

Calculus and Pre-Calculus

- The learner will be able to study curves applying the notions of monotonicity and concavity; optimization, both absolute and relative extrema.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to apply Riemann sums and the Trapezoidal Rule to estimate definite integrals of functions illustrated algebraically, geometrically, and by tables of values.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 51
- The learner will be able to describe the relationship between differentiability and continuity.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to apply strategies of antidifferentiation.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 51
- The learner will be able to describe the relationship between a Riemann sum and a definite integral.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to evaluate definite integrals by applying the Fundamental Theorem of calculus.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to use the basic properties of definite integrals.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to apply separable differential equations in modeling.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 51
- The learner will be able to give the definition of the derivative as the limit of the difference quotient.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to describe the relationship of increasing and decreasing behavior of functions and the sign of first order derivatives.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50

- The learner will be able to describe corresponding attributes of graphs of functions, first order and/or second order derivatives.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p.50
- The learner will be able to illustrate an understanding of the Mean Value Theorem and its geometric consequence.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to describe the relationship of the concavity of functions and the sign of a second order derivative.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to use basic rules for the derivative of basic functions and their sum, product, and quotient.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to make verbal descriptions into equations involving derivatives and vice versa.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to determine points of inflections.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to apply the concept of implicit differentiation to determine the derivative of an inverse function.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to determine specific antiderivatives applying initial conditions including applications to motion along a line.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 51
- The learner will be able to make an interpretation of the derivative as an instantaneous rate of change.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to interpret the derivative as a rate of change in many different applied contexts.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50
- The learner will be able to calculate limits applying algebra.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to approximate limits from graphs or tables of data.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to apply the chain rule and implicit differentiation.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 50

Functions

- The learner will be able to study the graphs of polynomial, rational, radical, and transcendental functions applying suitable technology.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to predict and describe the observed local and global behavior of a function.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to illustrate the idea of the derivative geometrically, numerically, and analytically.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to illustrate an understanding of asymptotes in terms of graphical behavior.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49

- The learner will be able to illustrate a comprehension of continuity in terms of limits.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to explain asymptotic behavior in terms of infinite limits and limits at infinity.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to illustrate a geometric understanding of graphs of continuous functions.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49
- The learner will be able to make a comparison of the relative magnitudes of functions and their rates of change.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49

Problem Solving

- The learner will be able to explore problems individually or in cooperative groups.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49

Technology

- The learner will be able to appropriately use technology to solve problems.
  Source: TN: Curriculum Framework (9-12), January 30, 1998, Calculus, p. 49