

**PACE ACADEMY
BASIC CALCULUS
CURRICULUM GUIDE
S.Y. 2020-2021**

Most Essential Learning Competencies	Basic Calculus Lessons
THIRD QUARTER	
Illustrate the limit of a function using table of values and the limit of a function using a table of values and the graph of a function Distinguish between $f(x)$ and $f(c)$ Illustrate the limit theorems Apply the limit theorems in evaluating the limit of algebraic functions (polynomial, rational, and radical)	Lesson 3.1 The Limit of a Function: Theorems and Examples
Compute the limits of exponential, logarithmic, and trigonometric functions using table of values and graphs of the functions Evaluate the limits of expressions involving $\frac{\sin t}{t}$, $\frac{1-\cos t}{t}$, and $\frac{e^t-1}{t}$ using table of values Evaluate the limits of expressions resulting in the indeterminate form $\frac{0}{0}$	Lesson 3.2 Limits of Some Transcendental Functions and Some Indeterminate Forms
Illustrate continuity of a function at a point Determine whether a function is continuous or not Illustrate continuity of a function on an interval Determine whether a function is continuous on an interval or not	Lesson 3.3 Continuity of Functions
Illustrate different types of discontinuity (hole/removable, jump/essential, asymptotic/infinite)	Lesson 3.4 Different Types of Discontinuity
Illustrate the Intermediate Value and Extreme Value Theorem Solve problems involving continuity of a function	Lesson 3.5 Intermediate and Extreme Value Theorem
Illustrate the tangent line to the graph of a function at a given point Apply the definition of the derivative of a function at a given number Relate the derivative of a function to the slope of the tangent line	Lesson 3.6 The Derivative as the Slope of the Tangent Line
Determine the relationship between differentiability and continuity Derive the differentiation rules Apply the differentiation rules in computing the derivatives of algebraic, exponential and trigonometric functions	Lesson 3.7 Rules of Differentiation
Solve optimization problems	Lesson 3.8 Optimization

Compute higher-order derivatives of functions	Lesson 3.9 Higher-Order Derivatives and the Chain Rule
Illustrate the Chain Rule of differentiation	
Solve problems using the Chain Rule	
Illustrate implicit differentiation	Lesson 3.10 Implicit Differentiation
Apply the derivatives of the natural logarithmic and inverse tangent functions	
Use implicit differentiation to solve problems	
Solve situational problems involving related rates	Lesson 3.11 Related Rates
FOURTH QUARTER	
Illustrate the antiderivatives of functions	Lesson 4.1 Integration
Antiderivatives of polynomial and root functions	
Antiderivatives of integrals yielding exponential and logarithmic functions	
Antiderivatives of trigonometric Functions	Lesson 4.2 Techniques of Antidifferentiation
Compute the antiderivative of a function using substitution rule	
Compute the antiderivative of a function using a table of integrals (including those whose antiderivatives involve logarithmic and inverse trigonometric functions)	
Solve separable differential equations using antidifferentiation	Lesson 4.3 Application of Antidifferentiation to Differential Equations
Understanding which parts of a problem play roles in a differential or integral expression	Lesson 4.4 Application of Differential Equations in Life Sciences
Recognizing whether a situation is indicative of exponential, bounded, or logistic growth	
Setting up a differential or integral given situations involving exponential, bounded, and logistic growth	
Solving these differential equations and integrals	
Approximate the area of a region under a curve using Riemann sums: (a) left, (b) right, and (c) midpoint	Lesson 4.5 Riemann Sums and the Definite Integral
Define the definite integral as the limit of the Riemann sums	
Illustrate the Fundamental Theorem of Calculus	Lesson 4.6 The Fundamental Theorem of Calculus
Compute the definite integral of a function using the Fundamental Theorem of Calculus	
Illustrate the substitution rule	Lesson 4.7 Integration Technique: The Substitution Rule for Definite Integrals
Compute the definite integral of a function using the substitution rule	
Compute the area of a plane region using the definite integral	Lesson 4.8 Application of Definite Integrals in the Computation of Plane Areas
Solve problems involving areas of plane regions	

Reference:

Soaring 21st Century Mathematics: Basic Calculus (2017). Phoenix Publishing House, Inc.

Time Allotment: Five (5) synchronous sessions (40 minutes per session); Five (5) asynchronous sessions (40 minutes per session)

Promotion/Retention:

- Assessments will be categorized as the following with the corresponding weight:
 - Short Quizzes (20%)
 - Written Outputs (35%)
 - Product and Performance Tasks (45%)
- **Short Quizzes.** These include summative assessments after every lesson, group of related lessons, or chapter.
- **Written Outputs.** These include data recording and analyses, geometric and statistical analyses, graphs, charts, or maps, problem sets, and surveys.
- **Product and Performance Tasks.** These include diagrams, mathematical investigatory projects, models or making models of geometric figures, number representations, constructing graphs from survey conducted, multimedia presentation, outdoor math, probability experiments, problem-posing, reasoning and proof through recitation, using manipulatives to show math concepts or solve problems, and using measuring tools and devices.