Marietta City Schools

2025–2026 District Unit Planner

AP Calculus BC

Unit title	**BC Unit 8 (AP Unit 10): Infinite Sequences & Series**	**Unit duration (hours)**	BC Only: 3-4 Weeks

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): ***What will students learn?***

GA DoE Standards

Standards

AP Calc BC 10.1-10.15
10.1 Defining convergent and divergent infinite series
10.2 Working with geometric series
10.3 The nth term test for divergence
10.4 Integral test for convergence
10.5 Harmonic series and p-series
10.6 Comparison tests for convergence
10.7 Alternating series test for convergence
10.8 Ratio test for convergence
10.9 Determining absolute or conditional convergence
10.10 Alternating series error bound
10.11 Finding taylor polynomial approximations of functions
10.12 Lagrange error bound
10.13 Radius and interval of convergence of power series
10.14 Finding Taylor or Maclaurin series for a function
10.15 Representing functions as power series

Concepts/Skills to support mastery of standards

- Applying limits may allow us to determine the finite sum of infinitely many terms.
- An infinite series of numbers converges to a real number S (or has sum S), if and only if the limit of its sequence of partial sums exists and equals S.
- In addition to geometric series, common series of numbers include the harmonic series, the alternating harmonic series, and p-series.

- Determine whether a series converges or diverges.
- A series may be absolutely convergent, conditionally convergent, or divergent
- If a series converges absolutely, then it converges
- Approximate the sum of a series
- The Lagrange error bound can be used to determine a maximum interval for the error of a Taylor polynomial approximation to a function.
- A Taylor polynomial for f (x) is a partial sum of the Taylor series for f (x)
- The Maclaurin series for sin x, cos x, and ex provides the foundation for constructing the Maclaurin series for other functions. bc only

Vocabulary

Notation

If a is a real number and r is a real number such that $|r| < 1$, then the geometric series $\sum_{n=0}^{\infty} ar^n = \frac{a}{1-r}$. **BC ONLY**

The coefficient of the nth degree term in a Taylor polynomial for a function f centered at $x = a$ is $\frac{f^{(n)}(a)}{n!}$. **BC ONLY**

A power series is a series of the form $\sum_{n=0} a_n (x-r)^n$, where n is a non-negative integer, $\{a_n\}$ is a sequence of real numbers, and r is a real number. **BC ONLY**

Essential Questions

- How can the sum of infinitely many discrete terms be a finite value or represent a continuous function?

Assessment Tasks

List of common formative and summative assessments.

Formative Assessment(s):

Notebook, HW, quizzes, AP Classroom Progress Checks, skills checks

Summative Assessment(s):

Unit Test

Learning Experiences

Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
	1.	
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1	10.1	**Predict and Confirm** Demonstrate a geometric series, the harmonic series, and the alternating series distributing pieces of a donut, pizza, or licorice. Ask the class to predict how muc the student(s) will eventually receive in total. For instance, give three students ea one-fourth, then one-fourth of the remaining fourth, and so on. Students should that since the remaining part is approaching zero, each student will eventually re one-third. For alternating harmonic series, give one student a whole piece, then take away give ⅓, then take away ¼, and so forth.
2	10.2 10.3 10.4 10.5 10.6 10.7 10.8	**Graphic Organizer** Put students in groups with poster paper and have them organize and explain all series tests using pictures, text, flowcharts, cartoons, or other drawings. Have th include each test's conditions and how to choose which test to apply.

Content Resources
● AP Classroom (within AP Central, collegeboard.org), AP daily videos, progress checks ● Calculus textbook: Calculus, 11e, Larson & Edwards ● Tony Record (Avon HS) created resources ● Khan Academy ● Delta Math ● Flippedmath.com ● Master Math Mentor (pdf files and videos) ● Interactive NB pages ● Teacher created resources