

Calculus BC Schedule-- Unit 9 (Chapter 10) Infinite Series

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 22	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb
Lesson	10.2 Infinite Series	10.8 Power Series	10.8 Power Series	10.6 Ratio Test, 10.4 Direct Comparison Test	10.6 Ratio Test, 10.4 Direct Comparison Test Quiz 10.2 & 10.8
HMWK	HW1 --p.731 #19, 25,29,37,39,45,49, 51,53,55, AP Practice #4	HW2 --p.787 #45, 46,53a,54a,55a, 56a	HW3 --p.787 #57a, 58a,59,79a,80a, AP Practice #6,7b	HW4 --p.770 #5,7,9,23, p.752 #5,7,9 Study for Quiz 10.2 & 10.8	HW5 --p.770 #17,25,49, AP Practice #2, p.752 #1,57ab, AP Practice #3
Week 23	19-Feb	20-Feb	21-Feb	22-Feb	23-Feb
Lesson	NO SCHOOL -- President's Day	LATE START 10.3 Properties of Series, nth term Test, Integral Test, p-series Test, 10.4 Limit Comparison Test	10.3 Properties of Series, nth term Test, Integral Test, p-series Test, 10.4 Limit Comparison Test	10.5 Alternating Series, Absolute Convergence	10.5 Alternating Series, Absolute Convergence Black History Month Assembly?
HMWK	No Additional Homework	HW6 --p.743 #2,9, 10,11,15,17,21,23, 33, p.752 #15,17,23	HW7 --p.743 #39,41, AP Practice #1,2,3, p.752 #37,39, AP Practice #1	HW8 --p.762 #1,2, 7,9,19,41,43,49	HW9 --p.762 #45, AP Practice #4, p.775 #8,28,35
Week 24	26-Feb	27-Feb	28-Feb	1-Mar	1-Mar
Lesson	10.9 Taylor Series; Maclaurin Series	LATE START 10.9 Taylor Series; Maclaurin Series Quiz 10.3,10.4, 10.5, & 10.6	10.9 Taylor Series; Maclaurin Series	10.10 Taylor Polynomial Approximation & LaGrange Error Bound	10.10 Taylor Polynomial Approximation & LaGrange Error Bound
HMWK	HW10 --p.797 #7,9,29,30,31,34 Study for Quiz 10.3,10.4, 10.5, & 10.6	HW11 --p.797 #10, 11,13,15,17,19, p.787 #67	HW12 --p.797 #21,23,25,27,39, AP Practice #1,2,3	HW13 --p.805 #1,5,9,20,21, AP Practice #2,3,4	HW14 --Calculator p.805 #13ad, 14ad,15ad,16ad, AP Practice #5
Week 25	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar
Lesson	NO SCHOOL -- Casimir Pulaski Day	10.10 Taylor Polynomial Approximation & LaGrange Error Bound	10.2 - 10.10 Series	10.2 - 10.10 Series	<i>Unit 9 Review (Book Chapter 10)</i>
HMWK	No Additional Homework	HW15 --AP Practice Problems	HW16 --AP Series Problems	HW17 --AP Series Problems	HW18 --p.811 #16, 17,22,35,42,52, AP Review #1,5,7,11,12

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Week 26	<i>11-Mar</i>	<i>12-Mar</i>	<i>13-Mar</i>		
Lesson	<i>Unit 9 Review (Book Chapter 10)</i>	NO SCHOOL -- Teacher Institute Day	Unit 9 TEST		
HMWK	STUDY for TEST!!!	No Additional Homework	No Additional Homework		

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Unit 9: Infinite Series

LIM-7

Applying limits may allow us to determine the finite sum of infinitely many terms.

LEARNING OBJECTIVE

LIM-7.A

Determine whether a series converges or diverges. **BC ONLY**

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LIM-7.B

Approximate the sum of a series. **BC ONLY**

ESSENTIAL KNOWLEDGE

LIM-7.A.1

The n th partial sum is defined as the sum of the first n terms of a series. **BC ONLY**

LIM-7.A.2

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 . **BC ONLY**

LIM-7.A.3

A geometric series is a series with a constant ratio between successive terms. **BC ONLY**

LIM-7.A.4

If a is a real number and r is a real number such that $|r| < 1$, then the geometric series

$$\sum_{n=0}^{\infty} ar^n = \frac{a}{1-r} \quad \text{BC ONLY}$$

LIM-7.A.5

The n th term test is a test for divergence of a series. **BC ONLY**

LIM-7.A.6

The integral test is a method to determine whether a series converges or diverges. **BC ONLY**

LIM-7.A.7

In addition to geometric series, common series of numbers include the harmonic series, the alternating harmonic series, and p -series. **BC ONLY**

LIM-7.A.8

The comparison test is a method to determine whether a series converges or diverges. **BC ONLY**

LIM-7.A.9

The limit comparison test is a method to determine whether a series converges or diverges. **BC ONLY**

LIM-7.A.10

The alternating series test is a method to determine whether an alternating series converges. **BC ONLY**

LIM-7.A.11

The ratio test is a method to determine whether a series of numbers converges or diverges. **BC ONLY**

EXCLUSION STATEMENT

The n th term test for divergence, and the integral test, comparison test, limit comparison test, alternating series test, and ratio test for convergence are assessed on the AP Calculus BC Exam. Other methods are not assessed on the exam. However, teachers may include additional methods in the course, if time permits.

LIM-7.A.12

A series may be absolutely convergent, conditionally convergent, or divergent. **BC ONLY**

LIM-7.A.13

If a series converges absolutely, then it converges. **BC ONLY**

LIM-7.A.14

If a series converges absolutely, then any series obtained from it by regrouping or rearranging the terms has the same value. **BC ONLY**

LIM-7.B.1

If an alternating series converges by the alternating series test, then the alternating series error bound can be used to bound how far a partial sum is from the value of the infinite series. **BC ONLY**

LIM-8

Power series allow us to represent associated functions on an appropriate interval.

LEARNING OBJECTIVE

LIM-8.A

Represent a function at a point as a Taylor polynomial. **BC ONLY**

LIM-8.B

Approximate function values using a Taylor polynomial. **BC ONLY**

LIM-8.C

Determine the error bound associated with a Taylor polynomial approximation. **BC ONLY**

LIM-8.D

Determine the radius of convergence and interval of convergence for a power series. **BC ONLY**

LIM-8.E

Represent a function as a Taylor series or a Maclaurin series. **BC ONLY**

LIM-8.F

Interpret Taylor series and Maclaurin series. **BC ONLY**

LIM-8.G

Represent a given function as a power series. **BC ONLY**

ESSENTIAL KNOWLEDGE

LIM-8.A.1

The coefficient of the n th degree term in a Taylor polynomial for a function f centered at

$$x = a \text{ is } \frac{f^{(n)}(a)}{n!} \quad \text{BC ONLY}$$

LIM-8.A.2

In many cases, as the degree of a Taylor polynomial increases, the n th degree polynomial will approach the original function over some interval. **BC ONLY**

LIM-8.B.1

Taylor polynomials for a function f centered at $x = a$ can be used to approximate function values of f near $x = a$. **BC ONLY**

LIM-8.C.1

The Lagrange error bound can be used to determine a maximum interval for the error of a Taylor polynomial approximation to a function. **BC ONLY**

LIM-8.C.2

In some situations, the alternating series error bound can be used to bound the error of a Taylor polynomial approximation to the value of a function. **BC ONLY**

LIM-8.D.1

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

LIM-8.D.2

If a power series converges, it either converges at a single point or has an interval of convergence. **BC ONLY**

LIM-8.D.3

The ratio test can be used to determine the radius of convergence of a power series. **BC ONLY**

LIM-8.D.4

The radius of convergence of a power series can be used to identify an open interval on which the series converges, but it is necessary to test both endpoints of the interval to determine the interval of convergence. **BC ONLY**

LIM-8.D.5

If a power series has a positive radius of convergence, then the power series is the Taylor series of the function to which it converges over the open interval. **BC ONLY**

LIM-8.D.6

The radius of convergence of a power series obtained by term-by-term differentiation or term-by-term integration is the same as the radius of convergence of the original power series. **BC ONLY**

LIM-8.E.1

A Taylor polynomial for $f(x)$ is a partial sum of the Taylor series for $f(x)$. **BC ONLY**

LIM-8.F.1

The Maclaurin series for $\frac{1}{1-x}$ is a geometric series. **BC ONLY**

LIM-8.F.2

The Maclaurin series for $\sin x$, $\cos x$, and e^x provides the foundation for constructing the Maclaurin series for other functions. **BC ONLY**

LIM-8.G.1

Using a known series, a power series for a given function can be derived using operations such as term-by-term differentiation or term-by-term integration, and by various methods (e.g., algebraic processes, substitutions, or using properties of geometric series). **BC ONLY**