

## Chapter 9 Study Sheet

Below is a list of things that will most likely be on the test. (Out of this list, may 2 or 3 may not appear or may not have to be used.)

- Geometric series
  - Sum from the series (You have to be able to identify that it is geometric.)
  - Series from the function (Example: the series for  $f(x) = 10/(x+3)$ )
- Be able to recall the series expansions for the following
  - $\ln(1 + x)$
  - $\sin x$
  - $\cos x$
  - $\arctan x$
  - $e^x$
- Integrate and/or differentiate a series
- Create a series from a composite function. (Example: series for  $\cos(5x)$ )
- Create a Taylor series by using derivatives
- Convergence or diverge using the following test (you will have to know which test(s) to use)
  - Geometric
  - P-series
  - nth term test of divergence
  - Ratio
  - Root
  - Direct comparison
  - Limit comparison
  - Integral test
  - Alternating series test
- Interval of convergence (you must determine what happens at the end points)
- Error
  - Lagrange error bounds using Taylor's Theorem
  - Error of alternating series
  - You should be able to find the interval for  $x$  which will yield a specific amount of error
  - If you want a specific amount of error, you need to be able to determine how many terms you need.
- Given a repeating decimal use series to rewrite it as a fraction
- Approximate the value of a function using a series (Example: Use a 3<sup>rd</sup> degree Taylor to approximate the value of  $\sin(0.3)$ .)
- Multi-step problems similar to AP FRQs.