**Math 280: 11.10 Taylor Series and Maclaurin Series**

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Which functions can be represented by a power series?

Let’s explore a generic power series expansion of centered at  and determine how it’s coefficients  relate to the derivatives of .

Say that  for 



















Can you see a pattern? 

Solve for . 

*Theorem 5:* If  has a power series representation at *a*, that is, if

  for 

then its coefficients are given by 

We call this the **Taylor Series Expansion of  at ** (or “about *a*”, or “centered at *a*”)

 

A Taylor Series when *a* = 0 is called a **Maclaurin Series.**

**Maclaurin Series:** 

*Theorem 8:* If , where  is the *n*th-degree Taylor polynomial of *f* at *a* and

  for ,

 then *f* is equal to the sum of its Taylor series on the interval 

***Taylor’s Inequality:*** If  for , then the remainder  of the

Taylor series satisfies the inequality

  for 