

MATH 153

Today

1. WeBWorK/Questions
2. 8.6 Representation of Functions as Power Series

Goals:

1. 8.6 Representation of Functions as Power Series (Understand that some functions have representations as power series; understand how to differentiate a power series)

Where is today's material used?

1. Power series are frequently used to approximate more complicated functions in physics and chemistry.
2. Power series techniques are used to solve certain differential equations.

8.6 Representation of Functions as Power Series

1. **Theorem:** Let $f(x) = \sum_{n=0}^{\infty} c_n(x - a)^n$ be a power series about a with radius of convergence R . Then f is differentiable and continuous on $(a - R, a + R)$, and $f'(x) = \sum_{n=1}^{\infty} n c_n(x - a)^{n-1}$ and $\int f(x) dx = \sum_{n=0}^{\infty} c_n \frac{(x - a)^{n+1}}{n + 1} + C$. In addition, f' and $\int f(x) dx$ have the same radius of convergence as f .

2. Examples: 8.6, p. 474: 3-10, 13, 16, 27.

Next Time

1. 8.7: Taylor and Maclaurin Series
2. **Turn in** 8.6 WeBWorK Set 12: 2, 3