

# Exam 4 Study Sheet

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Exam 4 is scheduled for Friday, May 3, during class. The exam will cover sections 11.1–11.10, 11.12, and 10.1–10.4. Most of the exam questions should be quite predictable. Here are some obvious things you should certainly be prepared for:

## 1. Sequences and Series of Numbers

- See the Review Sheet for Test 3

## 2. Power Series

- definition, interval of convergence, radius of convergence
- graphs
- important examples:  $e^x$ ,  $\sin(x)$ ,  $\cos(x)$ ,  $\arctan(x)$ ,  $\ln(x)$  (centered at 1),  $\ln(1-x)$  (centered at 0),  $\frac{1}{1-x}$ .
- How to recognize series as functions when they are built up from important examples using substitution, differentiation and integration.
- Taylor's Theorem
  - how to use it to get a power series
  - how to tell if power series converges to the desired function
  - how to use remainder formula to get error bounds for approximations
- manipulating power series by substitution, differentiation, integration; this includes the effects on the interval of convergence.

## 3. Parametric Equations and Polar Coordinates

- basics: sketching graphs, recognizing graphs, how points get on a graph.
- tangents, areas, volumes, surface areas for parametric curves; tangents for polar curves

## 4. *Mathematica*

You may be asked to write down *Mathematica* commands that could be used to solve a problem and to explain how you would use the *Mathematica* output to get the solution. In particular, you should know how to use the following commands with proper syntax:

- `ParametricPlot[]`
- `Table[]`, `Sum[]`, and `NSum[]` in the context of sequences and series
- `Integrate[]` and `NIntegrate[]`
- `Solve[]` and `NSolve[]`
- `N[]`