Presentation ideas for Part III

May 20, 2010

1. Any test for convergence of an infinite series:
   (a) The Integral Test and $p$-series
   (b) The Alternating Series Test
   (c) Direct Comparison
   (d) Limit Comparison
   (e) The Root Test
   (f) The Ratio Test

2. A complete discussion of the Taylor Polynomial of a function. (This could be done by two people if they were interested by choosing different functions.)

3. A discussion of the radius of convergence of a power series for $f(x), f'(x)$, and $\int f(x)dx$.

4. Approximating $\pi$ by the use of the arctangent function, and $e$ by the power series for $e^x$. (This has connections to the above two).

5. Find a power series for an odd looking function (see exercises 5–26 on page 676).

6. Any good description of a clever problem that requires infinite series (for example, the area of a union of nested triangles within a unit square).

7. Anyone want to research Abel’s theorem on convergence?

8. Anyone want to look up Riemann’s theorem on non-absolutely converging series?

9. Anyone want to present an introduction to absolute convergence and prove that a power series absolutely converges on closed interval subsets of its interval of convergence?