REVIEW FOR SECOND MIDTERM
MATH 104

You are expected to be able to...

- State the precise statements of Comparison Test, Ratio Test, Root Test, Integral Test, Alternating Series Theorem, and use them to prove whether a series converges (§14, 15).
- Use root test or ratio test to compute the radius of convergence of a power series. Then determine the exact interval of convergence, which is either a closed, open, or half-open–half-closed interval (or a point or $\mathbb{R}$ in extreme cases): §23.
- State precisely the two definitions (Definition 17.1 and the ϵ-δ definition) of continuous function, and prove that they are equivalent (Theorem 17.2).
- Prove the continuity of a function based on the definition (§17).
- Prove that the addition, multiplication, composition, etc. of two continuous functions are still continuous (Theorem 17.3, 17.4, 17.5).
- Prove Theorem 18.1 and Theorem 18.2 (most important properties of continuous functions).
- State the definition of uniformly continuous precisely. Prove the uniform continuity of a function based on the definition (§19).
- Prove that if a function is continuous on a closed interval $[a, b]$, then it is uniformly continuous on $[a, b]$ (Theorem 19.2).
- Prove other theorems on uniformly continuity: Theorem 19.4 and 19.5.
- State the precise definitions of pointwise convergence and uniformly convergence of a sequence of functions. Prove the pointwise/uniformly convergence of a sequence of function based on the definition (§24).
- Prove the uniform limit of continuous functions is continuous (Theorem 24.3).
- Prove other theorems on uniformly convergent: Theorem 25.2, 25.4, 25.7.
- Understand the limit, left-hand limit, right-hand limit of a function (Definition 20.3).