MATH 322/422 Spring 2022

Assignment #12, notes and hints
(*last updated 4/20*)

This assignment is for extra credit. It will be worth 50 points, or 50% of the usual weight of an assignment.

Problem 10.8.1 You may use the fact that if the radius of convergence of a (complex) power series is $R > 0$, then the series converges uniformly and absolutely on every disk $\{z : |z| \leq r\}$ with $r < R$.

Problem 10.8.2 You need to appeal to the appropriate results from Chapter 8, *The Integral*.

Problem 10.8.15 The note to the problem suggests: "Show that f must be identically equal to zero. Use Theorem 10.37." Another hint is to use Exercise 8.3.4.

Problem 12.4.4 For continuity at $(0,0)$, the simplest argument is to find a way to apply the Squeeze Theorem. The existence of first-order partial derivatives at $(x,y) \neq (0,0)$ is straightforward, the partial derivatives at $(0,0)$ need to be calculated directly from the definition. To show non-differentiability at $(0,0)$, either argue from the definition, or follow the argument given for another function on Wednesday. (Either way, there is no mystery of what $f'(0,0)$ needs to be, if it exists, namely $\nabla f(0,0)$, the gradient of f at $(0,0)$.

Problem 12.4.8 Recall similar examples in the one-variable case.