

MAT 127: Calculus C

Mini-Quiz:

Taylor series and interval of convergence

DO NOT TURN THIS PAGE OVER YET

This mini-quiz is **for practice only**. It will not be graded or even collected.

On the next page, you will find a problem containing four functions. You will need to expand each of them into a power series around the specified center and determine the radius and interval of convergence of the power series.

You have **25 minutes** to complete the entire problem.

The analogous problem on the final will have fewer parts. Taking about 20 minutes on it should be ok (this would be one point per minute, which is what you need to average). Thus, you are being asked to complete the mini-quiz at a slightly higher pace than needed for the final exam.

Find Taylor series expansions of the following functions around the given point. In each case, determine the radius of convergence of the resulting power series and its interval of convergence.

(a) $f(x) = \frac{1}{1 + 9x^2}$ around $x = 0$

(b) $f(x) = \frac{x^2}{(1 - 2x)^2}$ around $x = 0$

(c) $f(x) = x^3$ around $x = -1$

(d) $f(x) = e^{-x/2}$ around $x = 0$