

MTH 317/617

Homework #9

Due Date: November 11, 2022

1 Problems for Everyone

1. pg. 202, #16.
2. pg. 203, #18.
3. pg. 212, #3 parts (d,e,f). I know I asked you to do this in the last homework, but **what I told students in office hours was wrong**. For part (d) rewrite the numerator as a polynomial centered at $z = i$ (we did this in a prior homework). For part (e) and (f) Taylor expand the numerators around the singularities $z = -1$ and $z = 0$ respectively. **Sorry about any confusion!**
4. pg. 212, #4
5. pg. 212, #6, follow the problem's hint and Taylor expand the numerator for each integral.
6. For the following functions find the first five terms of the Taylor series about z_0 and determine the radius of convergence of the series

(a) $\frac{1}{1+z}$, $z_0 = 0$.

(b) e^{-z^2} , $z_0 = 0$.

(c) $z^3 \sin(3z)$, $z_0 = 0$.

(d) $z^3 \sin(3z)$, $z_0 = 0$.

(e) $\frac{1+z}{1-z}$, $z_0 = i$.

(f) $\frac{e^z}{3-2z}$, $z_0 = 0$.

(g) $\frac{z}{(1-z)^2}$, $z_0 = 0$.