

Homework #10

- (1) §5.5 #4.
- (2) Find the Laurent series for $f(z) = \frac{1}{1-z}$ valid centered at $z_0 = i$ in the domain $|z - i| > \sqrt{2}$.
- (3) Find two different Laurent series for $f(z) = \frac{3}{z+z^3}$ centered at $z_0 = 0$.
- (4) §5.5 #13.
- (5) §5.6 #2.
- (6) §5.6 #12.
- (7) Find the orders of the zeros of
 - (a) $\frac{2z^5-2z^7}{1+z}$
 - (b) $1 - \cos(z)$
- (8) Find the isolated singularities of the following functions and classify their types (if it is a pole, find its order).
 - (a) $z^{-5}e^z$
 - (b) $\frac{\sin z}{z+2z^2+z^3}$
 - (c) $\frac{e^{1/z}}{\sin(1/z)}$
- (9) Let $f(z)$ denote the principal branch of $\text{Log}(z)$. Let $g(z)$ be the Taylor series of $f(z)$ centered at $z_0 = -1 + i$.
 - (a) What is the radius of convergence of $g(z)$?
 - (b) What is the radius of the largest disk centered at $z_0 = -1 + i$ on which $f(z) = g(z)$.
- (10) Section 5.4: 4.