

Please let me (Saul) know if any of the problems are unclear or have typos.

Exercise 6.1. Prove the “easy” directions of the removable singularity theorem. \diamond

Exercise 6.2. Suppose that $f(z) = z/(z-1)$. For each choice of point z_0 , find a Laurent series expansion of f in a neighbourhood of z_0 .

a) $z_0 = 0$

b) $z_0 = 1$

c) $z_0 = \infty$

For the last we are asking for a series that converges in a neighbourhood of infinity. \diamond

Exercise 6.3. Suppose that $f(z) = 1/(z^2 - 1)$. Find a Laurent series expansion of f in a neighbourhood of $z_0 = 1$. \diamond

Exercise 6.4. Suppose that $f(z) = \frac{1}{z-1} + \frac{1}{z-2}$. For each choice of annulus A , find a Laurent series expansion of f that converges inside of A .

a) $A = A(0; 0, 1)$

b) $A = A(0; 1, 2)$

c) $A = A(0; 2, \infty)$

For the last we are asking for a series that converges in a neighbourhood of infinity. \diamond