Math 520 Homework 7

Due: Monday, March 30, 2026, 7pm
The homework needs to be turned in as a pdf to the gradescope; code 5DN86V

1. [Ahlfors, p. 130, #5] Prove that an isolated singularity of $f(z)$ is removable as soon as either $\mathbb{R}\mathrm{e}\, f$ or $\mathbb{I}\mathrm{m}\, f$ is bounded from below (Hint: Apply a fractional linear transformation.)

2. [Ahlfors, p. 133, #1] Determine explicitly the largest disk about the origin whose image under the mapping $w = z^2 + z$ is one to one.

3. [Ahlfors, p. 133, #2] Same for $w = e^z$.

4. [Ahlfors, p. 133, #3] Apply the representation $f(z) = w_0 + \zeta(z)^n$ to $\cos z$ with $z_0 = 0$. Determine $\zeta(z)$ explicitly.