1. Find the three cube roots of, \( z = -1 + 3i \). Draw a sketch.

2. Describe the set of points in the complex plane that satisfies, \(|z - 1| = |z + i|\). Make a sketch.

3. Does the limit \( \lim_{z \to 0} \frac{z}{z} \) exist?

4. Find the derivative of, \( f(z) = \frac{4z^3}{1+z} - iz + e^{2z} \ln z \).

5. Is the complex function, \( f(z) = \frac{x-1}{(x-1)^2+y^2} - i \frac{y}{(x-1)^2+y^2} \), analytic? If so, in what domain is it analytic?

6. Show that \( u = 2x - 2xy \) is harmonic, and find \( v \) the harmonic conjugate function of \( u \). Hence form the analytic function \( f(z) = u + iv \).

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