(1) Show that \( u(x, y) = \log_e(x^2 + y^2) \) is a harmonic function and determine \( v(x, y) \) so that \( w = u + iv \) is an analytic function.

(2) Find the principal value of \( i^{(1-i)} \).

(3) Solve \( \sinh z = -1 \).