NAME:

Worksheet Week I

(a) Find and sketch all the cube roots of $-i$.

For the complex number $z_0 = \frac{1-i}{\sqrt{2}}$:

(b) Find z_0^{-1}. Express it in rectangular form.

(c) Find z_0^{99}. Express it in rectangular form.

(d) Sketch the set of points $z \in \mathbb{C}$ satisfying

$$\left|z - z_0 + \frac{1}{\sqrt{2}}\right| = 2.$$

Is this set open, closed or neither? Is it a domain?

(e) Sketch the set of points $z \in \mathbb{C}$ satisfying

$$|z - z_0| < |z|.$$

Is this set open, closed or neither? Is it a domain?