1. Compute \( \frac{3i+5}{4-3i} \)

2. \( z \in \mathbb{C} \). Prove that \( z \in \mathbb{R} \) if and only if \( z = \bar{z} \).

3. \( z_1, z_2 \in \mathbb{C} \). Prove that \( z_1z_2 = 0 \) if and only if at least one of \( z_1, z_2 \) is 0.

4. If \( z = x + yi \), where \( x, y \in \mathbb{R} \), prove that \( \sqrt{2}|z| \geq |x| + |y| \)

5. Sketch the region in the complex plane described by \( |z + i| \leq 4 \).

6. Compute \( (1 + \sqrt{3}i)^6 \)

7. \( z_1, z_2 \in \mathbb{C} \). Show that if \( Re(z_1) > 0 \) and \( Re(z_2) > 0 \), then

\[
Arg(z_1z_2) = Arg(z_1) + Arg(z_2)
\]

8. Find all the complex solutions of the equation \( z^4 + 4 = 0 \).