

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 $z_1 z_2 = 0$ 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

$$Arg(z_1 z_2) = Arg(z_1) + Arg(z_2)$$

8. Find all the complex solutions of the equation $z^4 + 4 = 0$.