Question 1. *Let* $(z_n)_n$ *be a sequence of complex numbers such that* $\lim_{n\to\infty} |z_n| = 0$. *Prove that* $\lim_{n\to\infty} z_n = 0$.

Question 2. *Let* $(z_n)_n$ *be a sequence of complex numbers such that* $\lim_{n\to\infty} z_n = z$. *Prove that* $\lim_{n\to\infty} |z_n| = |z|$.

Question 3. *Let* $(z_n)_n$ *be a sequence of complex numbers such that* $\lim_{n\to\infty} z_n = z$ *and* $\lim_{n\to\infty} \Re(z_n) = a$. *Prove that* $\Re(z) = a$.

Question 4. *Let* $(z_n)_n$ *be a sequence of complex numbers such that* $\lim_{n\to\infty} z_n = z$. *Prove that* $\lim_{n\to\infty} \Im(z_n) = \Im(z)$.

Question 5. *Let* $(z_n)_n$ *be a sequence of complex numbers such that* $|z_n| \leq a_n$ *for all* $n \in \mathbb{N}$ *where* $(a_n)_n$ *is a convergent sequence with* $\lim_{n\to\infty} a_n = 0$. *Prove that* $\lim_{n\to\infty} z_n = 0$.

Question 6. *Let* $(z_n)_n$ *be a sequence of complex numbers such that* $\lim_{n\to\infty} (z_n - \alpha)^2 = 0$, *where* $\alpha \in \mathbb{C}$. *Prove that* $\lim_{n\to\infty} z_n = \alpha$.

Question 7. *let* $(z_n)_n$ *be a sequence of complex numbers such that* $|z_n - z_{n-1}| \leq 2^{-n}$ *for all* $n \geq 1$. *Prove that* $(z_n)_n$ *is a Cauchy sequence.*