Question 1. *Let $(z_n)_n$ be a sequence of complex numbers such that $\sum_{n=1}^{\infty} z_n$ converges absolutely. Prove that $\sum_{n=1}^{\infty} \Re(z_n)$ and $\sum_{n=1}^{\infty} \Im(z_n)$ converge absolutely.*

Question 2. *Let $(z_n)_n$ be a sequence of complex numbers such that $\sum_{n=1}^{\infty} |z_n|^2$ converges. Prove that $\lim_{n\to\infty} z_n = 0$.*

Question 3. *Let $(z_n)_n$ be a sequence of complex numbers such that $\sum_{n=1}^{\infty} z_n$ converges. Prove that $\lim_{n\to\infty} z_n = 0$.*

Question 4. *Let $(z_n)_n$ be a sequence of complex numbers such that $\sum_{n=1}^{\infty} z_n$ converges. Prove that $\sum_{n=1}^{\infty} |z_n|$ converges.*

Question 5. *Let $(z_n)_n$ be a sequence of complex numbers such that $\sum_{n=1}^{\infty} z_n$ converges absolutely. Prove that $\sum_{n=1}^{\infty} z_n^2$ converges.*

Question 6. *Let $(z_n)_n$ be a sequence of complex numbers such that $\sum_{n=1}^{\infty} z_n$ converges conditionally. Prove that there exists infinitely many $n \in \mathbb{N}$ such that $\Re(z_n) = 0$.*