1. Suppose the series $\sum_{n=0}^{\infty} a_n$ and $\sum_{n=0}^{\infty} b_n$ both converge and $c \in \mathbb{R}$. Show that:
   (a) $\sum_{n=0}^{\infty} a_n + b_n$ converges to $\sum_{n=0}^{\infty} a_n + \sum_{n=0}^{\infty} b_n$
   (b) $\sum_{n=0}^{\infty} ca_n$ converges to $c\sum_{n=0}^{\infty} a_n$
2. Show that if eventually $0 \leq a_n \leq b_n$ and $\sum_{n=0}^{\infty} b_n$ converges then so does $\sum_{n=0}^{\infty} a_n$.
3. Suppose that the series $\sum_{n=0}^{\infty} a_n$ converges, show that $a_n \to 0$.
4. Suppose that $\dfrac{a_{n+1}}{a_n} > 1$ eventually, show that the series $\sum_{n=0}^{\infty} a_n$ diverges.