Let $\sum a_n x^n$ be a power series with a finite radius of convergence $R > 0$. Furthermore, let $\sum a_n x^n$ be convergent at $x = R$. Show that $\sum a_n x^n$ converges uniformly on the interval $[0, R]$.

Hints:
(a) First assume that $R = 1$. Use Abel’s Partial Sum Formula to show what you need to show.
(b) Next assume that $R > 0$. Use (a) to formally deduce this general case.
(c) This is a hard one - get started early.