4. (8 points) Show that if \( \sum_{n=1}^{\infty} a_n \) converges, then \( \lim_{n \to \infty} a_n = 0. \)

5. (8 points) In this question we will investigate the convergence of the power series \( \sum_{n=0}^{\infty} \frac{n^2}{e^n} (x + 2)^n. \)

(a) Find the radius of convergence, \( R \), of the power series. (Show your work.)

\[ R = \text{______________}. \]

(b) What is the interval of convergence of the power series?

\[ \text{______________} < x < \text{______________}. \]