1. Let $\sum_{n=0}^{\infty} c_n (x - a)^n$ be a power series with positive radius of convergence $r$, and assume at least one $c_n$ is nonzero. Show that there exists $\delta \in (0, r)$ such that $0 < |x - a| < \delta$ implies $\sum_{n=0}^{\infty} c_n (x - a)^n \neq 0$.

2. Find all values of $x$ for which the series

$$\sum_{n=1}^{\infty} \frac{x^n}{n2^n}$$

converges.