Problem 1. Suppose you have a power series centered at 2:

$$\sum_{n=0}^{\infty} a_n(x-2)^n = a_0 + a_1(x-2) + a_2(x-2)^2 + a_3(x-2)^3 + \cdots$$

You can't figure out the interval of convergence without knowing the coefficients $a_0, a_1, \ldots$. But which of the following are possible intervals of convergence and which can you rule out?

(a) the power series converges when $1 < x < 3$, i.e., in the interval $(1, 3)$
(b) the power series converges when $1 \leq x \leq 3$, i.e., in the interval $[1, 3]$
(c) the power series converges when $1 \leq x < 3$, i.e., in the interval $[1, 3)$
(d) the power series converges when $x < 1$ or $x > 3$, i.e., in the intervals $(-\infty, 1)$ and $(3, \infty)$
(e) the power series converges when $1 < x \leq 4$, i.e. in the interval $(1, 4]$
(f) the power series converges when $x > 0$, i.e., in the interval $(0, \infty)$
(g) the power series converges for all values of x, i.e., in the interval $(-\infty, \infty)$
(h) the power series never converges for any choice of x
(i) the power series converges only when $x = 2$

Problem 2. What is the interval of convergence for the following power series?

$$\sum_{n=1}^{\infty} \frac{x^n}{n3^n}$$