1. [4 points] Suppose that the power series \( \sum_{n=0}^{\infty} c_n (x - 3)^n \) converges at \( x = 6 \) and diverges at \( x = -2 \). What can you say about the behavior of the power series at the following values of \( x \)? For each part, circle the correct answer. Ambiguous responses will be marked incorrect.

   a. [1 point] At \( x = -3 \), the power series...
      
      \[
      \text{CONVERGES} \quad \text{DIVERGES} \quad \text{CANNOT DETERMINE}
      \]

   b. [1 point] At \( x = 0 \), the power series...
      
      \[
      \text{CONVERGES} \quad \text{DIVERGES} \quad \text{CANNOT DETERMINE}
      \]

   c. [1 point] At \( x = 8 \), the power series...
      
      \[
      \text{CONVERGES} \quad \text{DIVERGES} \quad \text{CANNOT DETERMINE}
      \]

   d. [1 point] At \( x = 2 \), the power series...
      
      \[
      \text{CONVERGES} \quad \text{DIVERGES} \quad \text{CANNOT DETERMINE}
      \]

2. [5 points] Determine the radius of convergence of the power series

\[
\sum_{n=0}^{\infty} \frac{(2n)!}{(n!)^2} x^{2n}.
\]

Justify your work carefully and write your final answer in the space provided. Limit syntax will be enforced.

Radius of convergence = ___________