Power Series

1. Find the radius and interval of convergence of $\sum_{k=0}^{\infty} \frac{2^k}{5^k} x^k$ using the steps below:

(i) $\boldsymbol{a_k} =$

(ii) $\boldsymbol{a_{k+1}} =$

(iii) Simplify $\frac{|\boldsymbol{a_{k+1}}|}{|\boldsymbol{a_k}|} =$

(iv) $\lim_{\boldsymbol{k} \to \infty} \frac{|\boldsymbol{a_{k+1}}|}{|\boldsymbol{a_k}|} =$

(v) Radius

(vi) Interval

2. Repeat the process shown in problem 1 for the following series:

A. $\sum_{k=0}^{\infty} \frac{1}{k+5} (x+2)^k$

B. $\sum_{k=0}^{\infty} (-1)^k \frac{1}{(2k+1)!} x^{2k+1}$

C. $\sum_{k=0}^{\infty}(-1)^k \frac{1}{k!\cdot 2^k}x^k$

D. $\sum_{k=0}^{\infty}\frac{k!}{3^k}(x-5)^k$

3. Find the radius and the interval of convergence.

A. $1+2\boldsymbol{x}+\frac{4\boldsymbol{x}^2}{2}+\frac{8\boldsymbol{x}^3}{3}+\frac{16\boldsymbol{x}^4}{4}+...$

B. $(\boldsymbol{x}-2)-\frac{(\boldsymbol{x}-2)^2}{2}+\frac{(\boldsymbol{x}-2)^3}{3}-\frac{(\boldsymbol{x}-2)^4}{4}+\cdots$

C. $\sum_{n=1}^{\infty}\frac{(-1)^n(x+3)^n}{5^n n^5}$

4. Suppose the power series $\sum_{n=0}^{\infty} C_n (x-2)^n$ converges for $x = 4$ and diverges for $x = 6$. Which of the following are true, false, or not possible to determine? Give reasons for your answers.

A. The power series converges for $x = 7$.

B. The power series converges for $x = 0.5$.

C. The power series diverges for $x = 5$.

D. The power series diverges for $x = -3$.

E. The power series diverges for $x = 1$.