Check convergence of $\sum u_n(x)$

① compute. $u_n'(x)$. find $\sup_{x\in E} u_n(x)$ [Don't forget to consider endpoints]

the series $\sum_{n\geq 1}^{\infty} \sup_{x\in E} u_n(x)$ only related to n.

Find Maclaurin series of the function

① find $f'(x) = \sum \cdots$ $\quad f(x) = f(0) + \int_0^x f'(t)\,dt$.

Find the function of power series(the critical point is to deal with the coefficient. The power of x can be adjusted)

① find $= (\sum \cdots)'$ or $(\sum \cdots)''$ $\Leftarrow$ $k x^{k-1}$.

find. $= \sum \int \cdots = \int \sum \cdots$ $\Leftarrow$ $\frac{x^{k+1}}{k+1}$.

Find the sum of numerical series. $\sum a_n$.

① prove the convergence.

Construct $f(x) = \sum a_n x^n$ (maybe x^{n+1}, x^{n+2}, ...).

(maybe need Abel's Thm. $S(R) = \lim_{x\to R^-} S(x)$ if $R = 1$.)

Find limits of variable upper limit. $\lim_{x\to\infty} \frac{\int_0^x f(t)\,dt}{g(x)}$

Use L'Hôpital's rule (check the condition first). $\left(\int_0^x f(t)\,dt\right)' = f(x)$.