Take-Home: Simpson's Rule - Long and Messy.

Error Estimate

$$K \geq \max_{x\in[a,b]} |f^{(4)}(x)|$$

* Error Estimate for Right-Endpoint Riemann Sum

TAKE-HOME

Right-Endpoint $\Delta x \sum_{k=1}^{n} f(a+k\Delta x)$

$$= \frac{b-a}{n} \sum_{k=1}^{n} f\left(a+\frac{b-a}{n}k\right)$$

who cares if it takes 2931 terms, if you can formulate the sum off the top of your head.

§11.6 #7

$$\sum_{n=0}^{\infty} \frac{(-6)^n}{(2n+1)!}$$

$$\left|\frac{a_{n+1}}{a_n}\right| = \left|(a_{n+1})\left(\frac{1}{a_n}\right)\right| = \left|\frac{(-6)^{n+1}}{\underbrace{(2(n+1)+1)!}_{\substack{(2n+2+1)! \\ =(2n+3)!}}} \cdot \frac{(2n+1)!}{(-6)^n}\right|$$

$$= \frac{6\,(2n+1)!}{(2n+3)!}$$

$$= \frac{6\,\cancel{(2n+1)(2n)(2n-1)\cdots 3\cdot 2\cdot 1}}{\underbrace{(2n+3)(2n+2)}_{4n^2\text{ basically}}\,\cancel{(2n+1)(2n)\cdots 3\cdot 2\cdot 1}} \xrightarrow{n\to\infty} 0 \; \underset{\Longrightarrow}{<1}$$

Converges