Goal for Rest of Ch 11

Given some series $\sum_{n=1}^{\infty} b_n$.

We use one of our tests (CT, LCT, RT, RT, AST) & see that $\sum_{n=1}^{\infty} b_n$ converges, i.e.

$$\underbrace{\sum_{n=1}^{\infty} b_n}_{\text{WTF - but hard}} \quad \frac{\text{this limit}}{\text{exists}} \quad \lim_{N\to\infty} \underbrace{\sum_{n=1}^{N} b_n}_{\text{can find one of these ....}}.$$

so we cope.

Think of as:

he is big

don't know him either

① $$\underbrace{\sum_{n=1}^{\infty} b_n}_{\text{WTF}} = \underbrace{\sum_{n=1}^{N} b_n}_{\text{can find}} + \underbrace{R_N}_{\text{don't know}}$$

② $$\sum_{n=1}^{\infty} b_n \approx \sum_{n=1}^{N} b_n$$ where the approximation is good within a remainder/error of R_N

③ $$\left|\sum_{n=1}^{\infty} b_n - \sum_{n=1}^{N} b_n\right| = |R_N| \underset{N \text{ big}}{\overset{\text{hope}}{<}} \text{some small number}.$$

④ $$\sum_{n=1}^{N} b_n - |R_N| < \sum_{n=1}^{\infty} b_n < \sum_{n=1}^{N} b_n + |R_N|.$$

Accuracy of an estimate

(reference: Swokowski, 2nd ed)

An approximation is accurate to k decimal places if the remainder/error term R is less than $5 \times 10^{-(k+1)}$ in absolute value. So

- to 1 decimal place if $|R| < 5 \cdot 10^{-2} = 0.05$
- to 2 decimal places if $|R| < 5 \cdot 10^{-3} = 0.005$
- to 3 decimal places if $|R| < 5 \cdot 10^{-4} = 0.0005$.

Help w/ Calculator's Scientific notation.

$a.b\,E\,k = (a.b)(10^k)$

$\xleftarrow[\;-k \text{ times}\;]{k<0}$ $\xrightarrow[\;k \text{ times}\;]{k>0}$

2> $6.1E3 = (6.1)(10^3) = 6100 = 6,100$.

2> $6.1E{-3} = (6.1)(10^{-3}) = .0061 = 0.0061$

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