More problems for section 11.5 of *Calculus, Early Transcendentals* by James Stewart, 8e.

1. Each of the given series is convergent.
i. Bound the absolute error that occurs when we approximate the sum s of the series with its 10th partial sum s_{10}
ii. Is s_{10} an overestimate or an underestimate of s?
iii. If we want to approximate s with an absolute error less than 10^{-8} using a partial sum of n terms, how large must n be?

a. $\sum_{k=1}^{\infty} \frac{(-1)^k}{k^{1.5}}$ b. $\sum_{k=1}^{\infty} \frac{(-1)^{k+1}}{k^2}$ c. $\sum_{k=1}^{\infty} \frac{(-1)^k}{k^3}$

d. $\sum_{k=1}^{\infty} \frac{(-1)^{k-1}}{k!}$ e. $\sum_{k=1}^{\infty} \frac{(-1)^{k+2}}{\ln(k+1)}$ f. $\sum_{k=1}^{\infty} \frac{(-1)^{k+1}}{k^2+1}$

Answers

1a. i. $|s - s_{10}| \leq 11^{-1.5}$, ii. Overestimate, iii. $1 + 10^{16/3} \leq n$ 1b. i. $|s - s_{10}| \leq 11^{-2}$, ii. Underestimate, iii. $10001 \leq n$ 1c. i. $|s - s_{10}| \leq 11^{-3}$, ii. Overestimate, iii. $1 + 10^{8/3} \leq n$ 1d. i. $|s - s_{10}| \leq \frac{1}{11!} \approx 2.5 * 10^{-8}$, ii. Underestimate, iii. $11 \leq n$ 1e. i. $|s - s_{10}| \leq \frac{1}{\ln 12} \approx 0.379$, ii. Overestimate, iii. $-2 + e^{10^8} \leq n$ 1f. i. $|s - s_{10}| \leq \frac{1}{123}$, ii. Underestimate, iii. $-1 + \sqrt{10^8 - 1} \leq n$