11.5 Solutions

7) $\sum_{n=1}^{\infty} (-1)^n \left(\frac{3n-1}{2n+1}\right)$ $b_n = \frac{3n-1}{2n+1} = \lim_{n\to\infty} \frac{3n-1}{2n+1} = \frac{3}{2} \neq 0$

Diverges by test of divergence

12) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{e^{\frac{1}{n}}}{n}$ $b_n = \frac{e^{\frac{1}{n}}}{n} > 0$ $\lim_{n\to\infty} \frac{e^{\frac{1}{n}} \to}{n \to} \frac{1}{\infty} =$

Convergent by Alternating series test.

14) $(-1)^{n-1}\left(\frac{\ln n}{n}\right)$ $b_n = \frac{\ln n}{n}$ $\lim_{n\to\infty} \frac{\ln n}{n} \overset{H}{=} \frac{\frac{1}{n}}{1} = 0$

Convergent.

19) $\sum_{n=1}^{\infty} (-1)^n \frac{n^n}{n!}$ $= \frac{n^n}{n!} = \frac{n \cdot n \cdots n}{1 \cdot 2 \cdots n}$ $\lim \frac{n^n}{n!} = \infty$

diverges.

24) $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^4}$ (error $| < .001$) $\Rightarrow b_n = \frac{1}{n^4}$

$\frac{1}{n^4} < .001$ $\frac{1}{.001} < n^4$ $\sqrt[4]{\frac{1}{.001}} < n$ $n \geq 5.62$

$n = 5$