1. Carefully complete the following definitions. (This means copy them from the book.)

    a. A sequence is ...

    b. A sequence $\{a_n\}$ converges if ...

    c. A series $\displaystyle\sum_{n=0}^{\infty} a_n$ converges if ...

2. Determine whether these sequences converge. Name and demonstrate the test used.

    a. $\left\{ \dfrac{3n^2+5}{2n^2+80n-3} \right\}$

    b. $\left\{ n\, \sin(\dfrac{\pi}{n}) \right\}$

    c. $\left\{ \dfrac{\cos(n)}{\sqrt{n}} \right\}$

    d. $\left\{ 6\,(-1.01)^n \right\}$

3. Find the sum of these series exactly if they converge.

    a. $\displaystyle\sum_{n=2}^{\infty} \dfrac{2^{n+1}}{5^{n-1}}$

    b. $\displaystyle\sum_{n=1}^{\infty} \dfrac{12}{n^2+4n}$

4. Determine whether these series converge. Name and demonstrate the test used.

    a. $\displaystyle\sum_{n=1}^{\infty} \dfrac{n-1}{n^2+4n}$

    b. $\displaystyle\sum_{n=1}^{\infty} (-1)^n \dfrac{n-1}{n^2+4n}$ (Determine whether absolutely convergent, conditionally convergent or divergent.)

    c. $\displaystyle\sum_{n=1}^{\infty} \dfrac{3n}{1+8n}$

    d. $\displaystyle\sum_{n=1}^{\infty} (\dfrac{3n}{1+8n})^n$

e. $\displaystyle\sum_{n=1}^{\infty} \frac{10^n}{n!}$

f. $\displaystyle\sum_{n=1}^{\infty} \sin(n)$

g. $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{1}{n^2+1}$ (Determine whether absolutely convergent, conditionally convergent or divergent.)

h. $\displaystyle\sum_{n=1}^{\infty} \frac{n+5}{5^n}$

i. $\displaystyle\sum_{n=1}^{\infty} \frac{\cos(\frac{n}{2})}{n^2+4n}$

j. $\displaystyle\sum_{n=1}^{\infty} \frac{e^{\frac{1}{n}}}{n^2}$ (Use integral test.)

k. $\displaystyle\sum_{n=1}^{\infty} \frac{(2n)^n}{n^{(2n)}}$

Extra Credit:

l. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{(\ln n)^{\ln n}}$

m. $\displaystyle\sum_{n=1}^{\infty} (\sqrt[n]{2}-1)$