Math 276 Discussion Worksheet 14

1. Evaluate the following limits.

    a. $\displaystyle\lim_{n\to\infty}\left(1-\frac{1}{n}\right)^{2n}$

    b. $\displaystyle\lim_{n\to\infty}(\log n)^{1/n}$

    c. $\displaystyle\lim_{n\to\infty}n^2\left(1-\cos(\frac{2}{n})\right)$

2. Determine the divergence or convergence of the following improper integrals.

    a. $\displaystyle\int_1^\infty\frac{\sqrt{x+1}}{x^2}dx$

    b. $\displaystyle\int_0^2\frac{1}{\sqrt[3]{|x-1|^2}}dx$

    c. $\displaystyle\int_2^\infty\frac{x+1}{x^2\log x}dx$

3. Determine the divergence or convergence of the following series.

    a. $\displaystyle\sum_{n=1}^\infty\frac{\sqrt{n+1}}{n^2}$

    b. $\displaystyle\sum_{n=1}^\infty\frac{(-1)^n}{n^{1/\log n}}$

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