Calculus III Honors Spring 2012
Exam 1 - Practice Problems, Set 2

1. T F If (a_n) is increasing and $a_n < 1$ for all n, then $\lim_{n\to\infty} a_n = 1$.
2. T F If $\sum a_n = \infty$ and $\sum b_n = \infty$, then $\sum(a_n + b_n) = \infty$.
3. T F If $a_n \to 0$ as $n \to \infty$, then $\sum a_n$ converges.
4. Define what it means for a series to converge.

For each of the following problems, determine (a) if the sequence (a_n) converges, and if so, find its limit; and (b) if the series $\sum a_n$ converges, and if possible, find its limit.

5. $a_n = \cos(n\pi/2)$
6. $a_1 = 5$, $a_{n+1} = a_n/3$.
7. $a_n = \frac{n^n}{n!}$
8. $a_n = \frac{2}{n^2-2n}$
9. $a_n = \left(\frac{1}{n} - \frac{1}{n+1} + \frac{1}{n+2}\right)$.
10. $a_1 = 1$, $a_{n+1} = \sqrt{1 + a_n}$.