My Office Hours: M & W 2:30–4:00, Tu 2:00–3:30, & F 1:30–2:30 or by appointment. **Math Intern:** Sun: 2:00–5:00, 7:00–10pm; Mon thru Thu: 3:00–5:30 and 7:00–10:30pm in Lansing 310.
Website: `http://math.hws.edu/~mitchell/Math131F15/index.html`.

Practice

Read 8.3 on Series. Read today's online notes about sequences and try some of the problems.

1. These practice problems familiarize you with sequence terminology.
   (*a*) These will help you get familiar to sequences. Page 604ff #9, 11, 13, 17, 19, 23(a,c), and 27(a,c).
   (*b*) These have you calculating limits of sequences. Page 616 # 9, 11, 17, 19, 25, 27, 29, 31, 45, 47, 49, 50, 51.

Summary of Key Limits

You should know and be able to use all of the following limits.

1. $\lim_{n\to\infty}\left(1+\frac{k}{n}\right)^n = e^k$. In particular $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = e$.

2. $\lim_{n\to\infty} n^{1/n} = \lim_{n\to\infty}\sqrt[n]{n} = 1$.

3. $\lim_{n\to\infty}\frac{n!}{n^n} = 0$ and $\lim_{n\to\infty}\frac{n^n}{n!} = \infty$ (diverges).

4. Consider the sequence $\{r^n\}_{n=1}^{\infty}$, where r is a real number.
   (*a*) If $|r| < 1$, then $\lim_{n\to\infty} r^n = 0$;
   (*b*) If $r = 1$, then $\lim_{n\to\infty} r^n = 1$;
   (*c*) Otherwise $\lim_{n\to\infty} r^n$ does not exist (diverges).

Hand In at Lab

Work on WeBWorK `setDay 31` due Saturday. Finish WeBWorK `setDay 30`.

1. Use exponent algebra and Key Limits to evaluate the limits of the following sequences. You should not have to use l'Hopital's rule.

   (*a*) $\left\{\left(1-\frac{6}{n}\right)^{2n/3}\right\}_{n=1}^{\infty}$ (*b*) $\left\{n^{8/n}\right\}_{n=1}^{\infty}$ (*c*) $\left\{2^{3n}\cdot 9^{-n}\right\}_{n=1}^{\infty}$ (*d*) $\left\{(-2)^{-n}\right\}_{n=1}^{\infty}$

2. Determine whether the integral is improper. Then evaluate it $\int_{-2}^{0}\frac{1}{x^2+5x+6}\,dx$. Be careful. **Make sure to use proper mathematical grammar.**

3. (*a*) Carefully determine $\lim_{n\to\infty}(n+2)^{1/n}$. **Make sure to use proper mathematical grammar.**
   (*b*) Now find the limit of $\left\{n^2\sin\left(\frac{1}{n}\right)\right\}_{n=1}^{\infty}$.

4. Show that these sequences is monotonic using the 'derivative method.'

   (*a*) $\left\{2-\frac{3}{n}\right\}_{n=1}^{\infty}$ (*b*) $\{n\ln n\}_{n=1}^{\infty}$