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 (Not to be handed in)

1. Read Chapter 5.1 on the Estimation of Areas under Curves. Key terms: **regular partition**, **Riemann sum**, left and right Riemann sums, summation (sigma) notation.
2. Review your notes, including the Area Properties.
3. Working with sigma notation: Page 344–45 #39, 41,
4. Review Lab 1 Answers Online.
5. Antiderivative practice (some were listed last time): Page 327–8, #17, 25, 37, 47, and 49 (see Example 6 on p. 324).

Hand In: Due Friday

0. (*a*) Do the WeBWorK set Day02 (Due XX Night.) It covers summations and some integral and derivative reviews.
   (*b*) Finish the earlier WeBWorK assignments today.
1. Page 344 #40(a,d).
2. Use Theorem 5.1 to evaluate the following: Page 345 #42(b,d,g). Also see WeBWorK set Day02 #1–3.
3. Use summation properties and formulæ (see Theorem 5.1) to evaluate the following general sums. Your answer will be in terms of n. [For part (c), square it first]. **Simplify all answers**. Also see WeBWorK set Day02 #4–6.

   (*a*) $\displaystyle\sum_{i=1}^{n}\left(\frac{2i}{n}\right)\left(\frac{2}{n}\right)$ (*b*) $\displaystyle\sum_{i=1}^{n}\frac{i^2-10}{n^3}$ (*c*) $\displaystyle\sum_{i=1}^{n}\left(1+\frac{i}{n}\right)^2\left(\frac{1}{n}\right)$
4. Evaluate the following limits using your answers to #3. [Do not redo the work in #3]. Use proper limit notation.

   (*a*) $\displaystyle\lim_{n\to\infty}\sum_{i=1}^{n}\left(\frac{2i}{n}\right)\left(\frac{2}{n}\right)$ (*b*) $\displaystyle\lim_{n\to\infty}\sum_{i=1}^{n}\frac{i^2-10}{n^3}$ (*c*) $\displaystyle\lim_{n\to\infty}\sum_{i=1}^{n}\left(1+\frac{i}{n}\right)^2\left(\frac{1}{n}\right)$
5. Chain rule review: Determine the **derivatives** of

   (*a*) $f(x)=3\tan^4 x$ (*b*) $g(x)=6+\ln(8x^5)$
6. The population P of a bacteria colony grows at the rate $\dfrac{dP}{dt}=k\sqrt{t}$, where t is time in days. The initial population was $P(0)=500$ and the population after 1 day was $P(1)=600$. Find the population function $P(t)$. (Review Lab 1, Problem #8 and its answer on line.)
7. Hand in Problem #12 on Lab 1. (Review Lab 1, Problem #11 and its answer on line.) Use the back of this sheet.

Math 131, Lab 1: Name: ______________________________

12. Sometimes when we have no formula for a function we are forced to do graphical antidifferentiation. Let $F(x)$ be the antiderivative of $f(x)$ on $[-3,4]$, where f is the function graphed below. Since F is an antiderivative of f, then $F' = f$. Use this relationship to answer the following questions.

(*a*) Where is F' positive? Negative? Use F' to determine the interval(s) where F increasing. Decreasing.

(*b*) At what x-value(s), if any, does F have a local max? Min?

(*c*) Determine where F'' is positive and negative. On what interval(s) is F concave up? Down?

(*d*) Does F have any points of inflection? If so, at which x-values??

(*e*) Assume F passes through the point $(-3,1)$ indicated with a $\bullet$; draw a potential graph of F.

(*f*) Assume, instead, that F passes through $(-3,-1)$ indicated by a $\circ$; draw a graph of F.

(*g*) What is the relationship between the two graphs you've drawn?