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 and Reading

1. (*a*) Reread and review Section 5.4 on average values. Read Section 5.5 on Substitution.

(*b*) Average values: Page 381 #25, 27, 29, 31.

(*c*) Read about definite integrals of odd and even functions (pages 377–78). Then do page 380–81 #7, 9, 15, and 43.

(*d*) MVTI: Page 382 #35. First find f_{ave} and the point c where $f(c) = f_{\text{ave}}$.

Hand In Next Class and WeBWorK Day08 (due Saturday night)

1. Do Lab 3, Problem 8(a). (Make use of Lab problem #7.)

2. Use the FTC to find $F'(x)$ if $F(x) = \int_{x^4}^{2} 8\sin(\pi t^2)\,dt$. Note the limits!

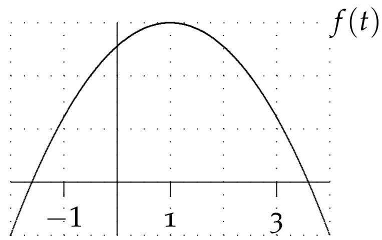
3. Suppose that $\int_{1/2}^{x} g(t)\,dt = x^2 \ln x$. Evaluate $g(1)$ and explain your answer. Hint: Apply FTC Part 1. See Lab 3, problem 4(e).

4. (*a*) Breathing is cyclic. From the beginning of inhalation to the end of exhalation takes about 4 s. The **flow rate** of air into the lungs is modeled by $f(t) = \sin(\frac{\pi}{2}t)$ liters/s. Find the **average** flow rate on the interval $[2, 4]$ seconds.

(*b*) **Extra credit**. The flow rate $f(t)$ is the rate of change in the volume $V(t)$ of air in the lungs. Find the **net change in the volume** of air in the lungs from time $t = 2$ to $t = 4$.

(*c*) What is going on physically during this period?

5. Let $f(t)$ be the function graphed below. FTC (Part 1) says that if $A(x) = \int_{-2}^{x} f(t)\,dt$, then $A'(x) = f(x)$. But also remember $A(x)$ is just the net area between f and the x axis on the interval from -2 to endpoint x.



(*a*) At what point(s), if any, does A have a local max?

(*b*) On what interval(s) is A increasing? Explain briefly.

(*c*) Is $A(0)$ a positive number or negative? Explain.

(*d*) Define $B(x) = \int_{3}^{x} f(t)\,dt$. Is $B(0)$ a positive number or negative? Explain. Think about net area and the limits of the integral.

6. Read about definite integrals of odd and even functions (p. 377–78). Then do $\displaystyle\int_{-101}^{101} x^9 - 5x^3 - 4x\,dx$.

7. Page 382 #40. First find f_{ave} and then the point c where $f(c) = f_{\text{ave}}$. Give both the exact value of c and a decimal approximation.

8. Determine $\displaystyle\frac{d}{dx}\left[\int_{1}^{x} \ln(t^2+1)\,dt + \int_{x}^{100} \ln(t^2+1)\,dt\right]$