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 5.4 on average values and the Mean Value Theorem for Integrals. Review 5.3 as needed.

1. (*a*) ✍ Practice is important. Page 373ff. Try #9, 11, 13 and 15.

(*b*) Using FTC I: Page 374 #61–6 and 101. (Even Answers: e^x, $-\frac{2x}{x^2+1}$, $-\frac{1}{x^2+1}$.)

(*c*) Working with definite integrals: Page 376 #87 (simplify first), 89, and 91.

(*d*) Assigned last time: Working with definite integrals: Page 374: #23, 27, 33, 37–43(odd), and 57. Remember, *net area* is signed area, so area below the axis is negative.

☞ *Hand In Due Next Time*

0. WeBWorK set `Day07` (due Thursday night). Some of the Hand-in problems are similar. Do them together.

1. Review: This problem asks you to compute a definite integral two different ways: using Riemann sums and using the FTC. Review the Homework I handed back. The answers are on line.

(*a*) Determine and simplify the formula for Right(n) for the function $f(x) = x^2 - x$ on the interval $[1,4]$. Do this on another sheet and staple it to this one. Put your final simplified formula below:

Right$(n) =$

(*b*) Determine the value of $\int_1^4 (x^2 - x)\,dx$ by using a limit of Riemann sums. Use correct limit notation.

(*c*) Using the Fundamental Theorem of Calculus, quickly evaluate $\int_1^4 (x^2 - x)\,dx$. (Are the answers the same?)

2. (*a*) Page 359 #38. Be careful, net area is signed area. Show your work using properties of the integral.

(*b*) Use the diagram on page 359 for #35–38 to determine $\int_{2\pi}^0 x \sin x\,dx$. Be careful of signs. Show your work using properties of the integral.

3. Use the FTC (which part) to evaluate the following. Show your work.

(*a*) $\int_1^2 \left(\frac{2}{s} - \frac{4}{s^2}\right) ds =$

(*b*) $\int_0^{2\pi} \sec \frac{x}{8} \tan \frac{x}{8} \, dx =$

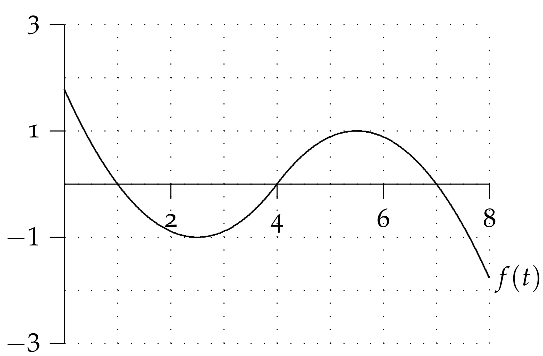
4. Use the FTC (which part) to simplify the following. Show your work. (See Example 5, p. 369.)

(*a*) $\frac{d}{dx}\left[\int_3^x t^2 \ln t \, dt\right] =$

(*b*) $\frac{d}{dx}\left[\int_x^{12} \cos(t^3) \, dt\right] =$

(*c*) $\frac{d}{dx}\left[\int_0^{\sin x} \frac{1}{1+t^6} \, dt\right] =$

5. This is just like the earlier graphing problems you did on Lab. Review if necessary. Let $A(x) = \int_0^x f(t) \, dt$, where $f(t)$ is the function graphed below. $A(x)$ **is the *net area* between** f **and the axis on the interval between** 0 **and the endpoint** x**.** Use this relationship and the part of the Fundamental Theorem that we proved today in class to answer the following questions. First determine:



(*a*) $A(0) =$ $A(1) =$ $A(2) =$ $A(3) =$

$A(4) =$ $A(5) =$ $A(6) =$ $A(7) =$ $A(8) =$

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

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

What about mins?

(*d*) Make a rough sketch of the graph of $A(x)$ on the same axes using your values of A including maxs and mins.