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:

   $$\text{Right}(n) =$$

   (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 $\int_0^\theta x \sin x \, dx$. 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) \[ \int_0^{2\pi} \sec \frac{s}{2} \tan \frac{s}{2} dx = \]

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) \[ \frac{d}{dx} \left[ \int_1^{12} \cos(t^3) \, dt \right] = \]

(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) \( A(0) = \quad A(1) = \quad A(2) = \quad A(3) = \quad A(4) = \quad A(5) = \quad A(6) = \quad A(7) = \quad A(8) = \)

(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.