Math 131 Homework: Day 7

My Office Hours: M & W 12:30–2:00, Tu 2:30–4:00, & F 1:15-2:30 or by appointment. **Math Intern** Sun: 12–6pm; M 3-10pm; Tu 2–6, 7–1pm; W and Th: 5-10 pm in Lansing 310. Website: `http://math.hws.edu/~mitchell/Math131S13/index.html`.

☕ Practice

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

1. a) ✍ Practice is important. Page 346ff. Try #9, 11, 13 and 15.

b) Using FTC I: Page 347–8 #51–56 and 89. (Even Answers: e^x, $-\frac{2x}{x^2+1}$, $-\frac{1}{x^2+1}$.)

c) Working with definite integrals: Page 348 #75 (simplify first), 77, 79, and 81.

d) Working with definite integrals (assigned last time): Page 346–7 #25 (multiply out first), 27, 33–39 (odd), 41, 43, and 47. Remember, *net area* is signed area, so area below the axis is negative. Area is always positive, so area below the axis counts as positive area (you need to change its sign).

☞ Homework

Complete the take-home quiz and bring it to Lab. Do WeBWorK set `Day07` (due Saturday night), also hand in the problems below on Friday. There are some similarities in the the two sets.

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 attach it to this one. Put your final 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 332 #34. Be careful, net area is signed area. Show your work using properties of the integral.

b) Look at the diagram on page 332 for #35–38. Use it to determine $\int_{2\pi}^0 x \sin x\,dx$. Be careful of signs. Show your work using properties of the integral.

3. Page 332 #42 (b only). Indicate your work. See WeBWorK Day07 for more like this.

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

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

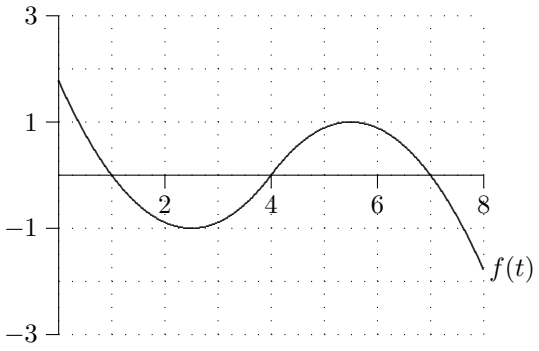
b) $\displaystyle\int_0^{2\pi} \sec\tfrac{x}{8}\tan\tfrac{x}{8}\, dx =$

5. Use the FTC (which part) to simplify the following. Show your work. (See Example 5, p. 341.)

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

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

6. 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 from 0 to the endpoint x. Use this relationship to answer the following questions.



a) Use the graph to estimate $A(0) =$ $A(2) =$

$A(4) =$ $A(6) =$ and $A(8) =$

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?

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