Assignments for Math 126, Spring 2014

(1/21)
1. Read the syllabus (available online; I will not be passing out printed versions) carefully.
2. Spend some time reviewing Calculus I, perhaps beginning with the summary of differential calculus posted on the class website.
3. Look over some of the practice problems for differential calculus posted on the class website. I will be giving you a printed version of this assignment on the first day of class.

(1/23)
1. Reread the syllabus.
2. Do the practice problems for differential calculus, reviewing as necessary.
3. Turn in solutions for problems 1, 9, and 12. You should model your solutions based on the sample homework solutions posted on the class website.
4. Browse Section 2.1 of the textbook.

(1/27)
1. Read Section 2.1 carefully.
2. Do the problems in Section 2.1.
3. Turn in solutions for problems 5c, 6, and 7. Remember to write your solutions clearly.
4. Browse Section 2.2 of the textbook.

(1/28)
1. Read Section 2.2 carefully.
2. Do the problems in Section 2.2. Problem 2 does require a careful sketch and then some thought about how to proceed; it is a good example of the type of thinking that is needed to solve non-routine problems. Do not spend too much time on problem 7 if you find it confusing.
3. Turn in solutions for problems 3 (x^3 only), 5d, and 6, where 5d is $y = 6 - |2x - 3|$ on $[0, 4]$.
4. Browse Section 2.3 of the textbook.

(1/30)
1. Read Section 2.3 carefully.
2. Do the problems in Section 2.3, omitting 7 and 8 if necessary.
3. Turn in solutions for problems 3, 4, and 2d, which is $\lim_{n\to\infty} \sum_{i=1}^{n} \left(5 - \frac{4i}{n}\right)^2 \frac{4}{n}$.
4. Browse Section 2.4 of the textbook.

(2/3)
1. Read Section 2.4 carefully.
2. Do the problems in Section 2.4. You should find these problems to go more quickly than the problems in previous sections. Do be careful with your notation (remember dx) and be aware of the linearity properties of the integral that you are using.
3. Turn in solutions for problems 2e, 4d, and 5d, where 4d is $\int_{-3}^{3} \left(8\sqrt{9 - x^2} + 10x^4\right) dx$ and 5d uses the interval $1 \le t \le 6$.
4. Browse Section 2.5 of the textbook.

(2/4)

1. Read Section 2.5 carefully.
2. Do the problems in Section 2.5. We did problem 6 informally in class so you can skip this one.
3. Turn in solutions for problems 3 (giving clear details), 4d, and 5 (using appropriate steps), where problem 4d is $\displaystyle\int_1^2 \left(3f(x) - 6x^2\right) dx$.
4. Browse Section 2.6 of the textbook.

(2/6)

1. Read Section 2.6 carefully.
2. Do the problems in Section 2.6.
3. Turn in solutions for problems 1j, 2, and 3, where 1j is $f(x) = \displaystyle\int_0^{3x} \ln(1+t^2)\, dt$.
4. Browse Section 2.7 of the textbook.

(2/10)

1. Read Section 2.7 carefully.
2. Do the problems in Section 2.7.
3. Turn in solutions for problems 1m, 1n, 1o, and 2, given

$$\text{1m.} \int_2^4 \frac{8}{x^3}\, dx \qquad \text{1n.} \int_0^1 \left(2x^2 + \sqrt[3]{x}\right) dx \qquad \text{1o.} \int_0^4 \frac{3}{x+4}\, dx$$

4. Browse Section 2.8 of the textbook.

(2/11)

1. Read Section 2.8 carefully.
2. Do the problems in Section 2.8.
3. Turn in solutions for problems 1p, 2g, and 3′, given

$$\text{1p.} \int \frac{24}{(3x+1)^3}\, dx \qquad \text{2g.} \int_0^1 \frac{8x+4}{x^2+x+1}\, dx \qquad \text{3}'\text{.} \int_0^2 (2x-3)\sqrt{4-x^2}\, dx$$

4. We have a test next class period. I will say a few things about it in class but there will not be an official review in class as I will be talking about Section 2.9.

(2/13)

1. We have our first exam this day, covering Sections 2.1 through 2.8.
2. The questions on the test will be similar to the homework problems you have been doing the past few weeks. You can find exams from a previous semester on the class website. For the first exam from Spring 2011, the test covered a few more sections than our test will cover. Problems 4, 7, 8, and 10 fit into this category. However, the four extra questions (which were not part of the exam) are relevant to the sections we have covered. In addition to the problems in each section (for the record, doing those problems again without your notes can be helpful), you can try problems 1 through 12 in Section 2.24.
3. As with the exam from the previous semester, no calculators will be allowed during the exam. You will have 55 minutes for the exam.

(2/17) 1. No class today due to President's Day.

(2/18) 1. Read Section 2.9 carefully.

2. You should look over the integrals in problem 1 and think about how you would solve each of them. Can you just write down the answer? Can you use guess and check? Do you need to make a substitution and, if so, what would u be? After making this assessment, do a few of each type beginning with 1b, 1e, 1i, 1j, 1k, and 1l. Repeat this process for problem 2, then begin with 2a, 2b, and 2e. Remember to change the limits for the definite integrals. Problems 3 and 4 indicate that there is more than one way to find an antiderivative while problem 5 shows how to determine the formula for the area of an ellipse. You can omit problem 6.
3. Turn in solutions for problems 1m, 2d, and 2g, where 1m. $\displaystyle\int \frac{x+3}{\sqrt{x-4}}\,dx$ 2g. $\displaystyle\int_0^4 \frac{1}{1+\sqrt{x}}\,dx$
4. Browse Section 2.10 of the textbook.

(2/20) 1. No class today due to the Power and Privilege Symposium.

(2/24) 1. Read Section 2.10 carefully.

2. Do the problems in Section 2.10 beginning with 1a, 1b, 1c, 1e, 1i, 1j, 2b, 2c, 2d, 2e, 3, and 4.
3. Turn in solutions for problems 1i, 2b, and 3 in Section 2.10.
4. Read Section 2.11 carefully and perhaps look at the extra notes for this section of Chapter 2.
5. Do problems 1a, 1d, 1e, 1f, 2a, 2b, and 7 in Section 2.11.
6. Browse Section 2.12 of the textbook.

(2/25) 1. Read Section 2.12 carefully.

2. Do the problems in Section 2.12. For some of these, sketch a careful graph and think before you set up the integrals.
3. Turn in solutions for problems 1c, 4, and 6. For problem 4, sketch a careful graph and decide which direction most easily describes the region in question.
4. Browse Section 2.13 of the textbook.

(2/27) 1. Read Section 2.13 carefully.

2. Do the problems in Section 2.13.
3. Turn in solutions for problems 1c, 2, and 9.
4. Browse Section 2.14 of the textbook.

(3/3) 1. Read Section 2.14 carefully.

2. Do the problems in Section 2.14.
3. Turn in solutions for problems 1a, 6ab, and 8.
4. Browse Section 2.19 of the textbook. (We will do some other applications after spring break.)

(3/4)

1. Read Section 2.19 carefully.
2. Do the problems in Section 2.19. Remember that these problems involve more algebra than calculus.
3. Turn in solutions for the three problems listed below.

$$\int \frac{2x-1}{x^2+6x+13}\,dx, \qquad \int \frac{4x-3}{\sqrt{33+8x-x^2}}\,dx, \qquad \int \frac{6x^3+14x+7}{x^2+9}\,dx.$$

4. Browse Section 2.20 of the textbook. It will be helpful (in fact, almost essential) to have access to Appendix B of the textbook (the table of integrals) for class on this day.

(3/6)

1. Read Section 2.20 carefully.
2. Do the problems in Section 2.20. You can omit 7 if you run out of time.
3. Turn in solutions for problems 1g, 5, and 6f.
4. Browse Section 2.21 of the textbook.

(3/10)

1. Read Section 2.21 carefully.
2. Do (or at least make the appropriate trig substitution and determine the new integral for) the problems in Section 2.21.
3. Turn in solutions for problems 1b, 2d, and 1g. $\displaystyle\int \frac{x^4}{\sqrt{4-x^2}}\,dx.$
4. Browse Section 2.22 of the textbook.

(3/11)

1. Read Section 2.22 carefully.
2. Do (or at least determine the partial fraction decomposition for) the problems in Section 2.21.
3. Turn in solutions for problems 1b and 1f.

(3/13)

1. We have a test on integration and the area/volume applications.
2. The first step in your review should be to go over the sections we have covered to make sure you understand the main ideas. You can then redo the problems in each section, you can look over the basic integration problems on the website (these do not involve the techniques from Sections 2.19–2.22), and you can work on problems 15, 16, 17, 18, 19, 27, 34, 35, 36a–f, and 37a–f in Section 2.24 (problems 18 and 19 are more challenging). If desired, we can have a review session the evening before the exam.

(3/31)

1. Read the prelude to Chapter 3 carefully.
2. Browse Section 3.1 of the textbook.

(4/1)
1. Read Section 3.1 carefully.
2. Do problems 1, 2, 3, and 5 in Section 3.1.
3. Read the first two pages of the Model Induction Proofs (see the Prelude to Chapter 3 for the appropriate link). You should be able to find two errors in each of the incorrect proofs.
4. Turn in a carefully written solution for problem 3.

(4/3)
1. Reread Section 3.1 if necessary. Spend some time thinking about Fibonacci numbers.
2. Do problems 4, 6, and 7 in Section 3.1. After working problem 4, read the third page of the Model Induction Proofs. You also should read the extra notes for Section 3.1, thinking carefully about each sentence of the examples given there.
3. Turn in a carefully written solution for problem 7d. A comment about this problem was discussed in class; be certain you understand what equation you are proving.
4. Browse Section 3.2 of the textbook.

(4/7)
1. Read Section 3.2 carefully.
2. Do the problems in Section 3.2.
3. Turn in solutions for problems 4e, 4g, 5c, and 6.
4. Browse Section 3.3 of the textbook.

(4/8)
1. No class today due to the undergraduate conference. Try to attend a few talks during the day.

(4/10)
1. Read Section 3.3 carefully.
2. Do the problems in Section 3.3.
3. Turn in solutions for problems 1b (there should be four steps), 2b, and 4.
4. Browse Section 3.4 of the textbook.

(4/14)
1. Read Section 3.4 carefully.
2. Do the problems in Section 3.4.
3. Turn in solutions for problems 2, 5, and 7. For 7, we have already proved that $1 \leq a_n \leq 3$ (see problem 5 in Section 3.1) so you just need to use induction to prove the increasing part, then (after concluding that the sequence converges) find the limit.
4. Browse Section 3.5 of the textbook.

(4/15)
1. Read Section 3.5 carefully.
2. Do the problems in Section 3.5.
3. Turn in solutions for problems 2b, 3e, 3i, and 5.
4. Browse Section 3.6 of the textbook.

(4/17)
1. Read Section 3.6 carefully.
2. Do the problems in Section 3.6.
3. Turn in solutions for problems 1d, 4c, and 5.
4. Browse Section 3.7 of the textbook.

(4/21)
1. Read Section 3.7 carefully.
2. Do the problems in Section 3.7. Problem 4 requires you to make some careful estimates.
3. Turn in solutions for problems 1b, 2a, 3a, and 3d.
4. Browse Section 3.8 of the textbook.

(4/22)
1. Read Section 3.8 carefully.
2. Do the problems in Section 3.8. Problem 8 is important since you must first decide which of the convergence tests to use. Even if you do not carry out all of the details, think carefully about what the series does and which test to use to verify your conjecture. Problems 5 and 9 require more thinking than the other problems.
3. Turn in solutions for problems 1c, 3, and 6.
4. Browse Section 3.9 of the textbook.

(4/24)
1. Read Section 3.9 carefully.
2. Do the problems in Section 3.9. Problem 6 is important for what is to come.
3. Turn in solutions for problems 2f, 3f, and 6c.
4. Browse Section 3.10 of the textbook.

(4/28)
1. Read Section 3.10 carefully.
2. Do the problems in Section 3.10.
3. Turn in solutions for the following three problems (read the appropriate headings)

$$\text{2d. } \sum_{k=1}^{\infty} \frac{3}{k4^k}(x-1)^k \qquad \text{6e. } (4,8] \qquad \text{7d. } \sum_{k=1}^{\infty} \frac{(-1)^{k+1}}{2^{k+1}}(x+1)^k$$

4. Browse Section 3.11 of the textbook. Since we have a test coming up very soon, you should start reviewing the material in Chapter 3.

(4/29)
1. Read Section 3.11 carefully.
2. Do problems 1, 2, and 4 in Section 3.11; I will not be collecting any of these.

(5/1)

1. We have an exam covering the first 11 sections of Chapter 3.
2. Go over the sections we have covered and review the key concepts. Practice some of the problems we have been doing, that is, do some of the problems again without looking at your previous solutions. Look at the exam on this material from a previous year (found on the website) and be certain the problems make sense and that you can do them with the time frame of an exam. For additional problems, you can work on problems 1, 14, 5, 6, 11, and 13 (in that order) in Section 3.14. When you feel you are ready, take the diagnostic quiz on Chapter 3. This quiz can be found on the website, along with complete solutions.

(5/5)

1. You will probably want/need to recover from a busy week.
2. Review Section 3.11 if necessary and browse Section 3.12.

(5/6)

1. Read Section 3.12 carefully.
2. Do problems 1, 2, and 5 in Section 3.12.

(5/8)

1. Read Section 3.12 again if necessary.
2. Do problem 3 in Section 3.12 and problems (or at least one part of each problem) 21, 24, 26, 28, 29, and 30 in Section 3.14.
3. Browse Section 2.15 of the textbook.

(5/12)

1. Read Section 2.15.
2. Do problems 1, 2, and 3 in Section 2.15.
3. Browse Section 2.18 of the textbook.

(5/13)

1. Read Section 2.18.
2. Do problems 1, 2, 3, 4, and 5 in Section 2.18.

(5/15)

1. Our final exam is scheduled for 2–5 pm.
2. At the course website, you can look at the link "Review for Final Exam" to get an idea about our final exam and what you can do to prepare for it. This review is from last year but still fully relevant. In addition to the links there, you can also go to my home page and click on the link "Written Exam in Mathematics". From there, you can follow the links that involve Calculus II.