

Preparing for the exam

1. **The ideas are the most important thing!**
2. **Problems will resemble quiz, homework and worksheet questions.** But they will not be identical to these. One good way to review is to examine each quiz and worksheet, deciding which major idea(s) each exercise is trying to illuminate. Another excellent way to study is to make up a mock exam. Make a list of the major themes and skills and write problems of three sorts: those which test one (or maybe two) basic skills, those which test for understanding of major themes and those which combine the two. Then give your mock exams to each other. It might be advantageous to make up problems which do not look anything like previous problems. I have given you a copy of questions I wrote for Calculus 2 exams from previous semesters.
3. **Practice some techniques.** Important techniques include:
 - Using Riemann Sums to approximate the area “under” a curve $f(x)$ on an interval $a \leq x \leq b$ with N boxes
 - determining the number of subdivisions needed to obtain a Riemann sum approximation of the definite integral of a monotone function to a given degree of accuracy, i.e. using the formula $E \leq \Delta x |f(b) - f(a)|$
 - finding the derivative of an accumulation function $F(x) = \int_a^{u(x)} f(t) dt$ (i.e. use the FTC and Chain Rule)
 - using basic properties of definite integrals and antiderivatives (i.e. integral of a sum is a sum of integrals, etc)
 - using the **Fundamental Theorem of Calculus** to evaluate definite integrals, i.e. $\int_a^b F'(x)dx = F(b) - F(a)$. In particular, you should know the table of antiderivatives below.

$f(x) = F'(x)$	$F(x) = \int f(x)dx$
1	$x + C$
$x^n \ (n \neq -1)$	$\frac{1}{n+1}x^{n+1} + C$
$\frac{1}{x}$	$\ln x + C$
$\sin(x)$	$-\cos(x) + C$
$\cos(x)$	$\sin(x) + C$
$\sec^2(x)$	$\tan(x) + C$
e^x	$e^x + C$
$a^x \ (a > 0)$	$\frac{1}{\ln(a)}a^x + C$
$\tan(x)$	$-\ln(\cos(x)) + C$
$\ln(x)$	$x \ln(x) - x + C$

4. Finding antiderivatives and evaluating definite integrals by using **integration by substitution** ($\int f'[g(x)]g'(x) dx = f[g(x)] + C$ pick $u = g(x)$ and convert integral to u variables. Either return to x -space or convert completely to u -space when evaluating definite integrals);
5. Finding antiderivatives and evaluating definite integrals by using **integration by parts** ($\int f \cdot g' dx = f \cdot g - \int f' \cdot g dx$ or $\int u dv = uv - \int v du$). Don't forget to use the limits of integration on all parts of the problem when using IBP to evaluate definite integrals.

Rules for the Exam

1. **BLUE NOTES:** You are allowed the attached half-sheet of “blue” paper for written notes. Only the use of notes on this blue sheet of paper will be permitted during the exam. **You may not use your calculator or your cellphone during the exam.** This policy will, of course, be reflected in test questions. There will be fewer problems involving simple calculations and more involving conceptual understanding and explanation of ideas.
2. You must take the exam during your regularly scheduled lab time unless you have made prior arrangements with me.
3. As usual, there will be a pledge on the exam. By signing the pledge, you indicate that you followed all the rules of this exam and furthermore that you promise not to discuss the exam with anyone (even people who have already finished the exam) until after **4:30 pm on Friday, February 14, 2014.** Although each exam will be different, they will be similar enough to be fair to each group. It is our collective responsibility to keep the exam as fair as possible.
4. No answer will be given credit without accompanying work. No exceptions. Unless otherwise indicated, answers should be left in exact form, i.e. no decimal approximations. I can not stress strongly enough that you must write your solutions in an **intelligible** and **coherent** fashion. When you are writing a solution to a problem you are attempting to communicate with the reader (me) how you solved the problem. I can assure you that if I do not how you arrived at an answer, **YOU WILL NOT GET CREDIT FOR THAT ANSWER.** The correct answer is important, yes, but assuring me that you know what technique needs to be used to arrive at this answer is more important. I would be very happy to see full sentences written explaining your answers.
5. This list of rules is not necessarily exhaustive. If you have any questions about what is allowed and what is not, you are responsible for asking me. Ignorance is not an excuse.

BLUE NOTES

Name: _____

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Name: _____