Math 2 – Winter 2006
Final Exam information

The final exam is scheduled for Saturday, March 11 from 3:00pm to 6:00pm in Bradley 103. You are allowed to bring a 3x5 notecard with you to use on the exam. You may use both the front and back of the notecard. You can put formulas on it, but you *cannot* put example problems on it.

Suggestions for studying for the final exam

Your studying should include:

- Looking over your homework and the "Fun with Integration" and "More Fun with Integration" projects and making sure that you understand how to do problems that were marked wrong. (You can find solutions to all of the homework as well as some of the projects on the "homework" page for the course.)
- Looking over your quizzes and exams and making sure that you know how to do all of the problems. In particular, make sure you understand what mistakes you made so that you won't repeat them. (You can find solutions to all of the quizzes and exams on the "exam/quiz notes" page for the course.) It is a good idea to re-do your quizzes.
- Completing the practice exam. The practice exam should help you identify what kinds of problems you need more practice with. If you have trouble completing some of the questions on the practice exam, ask your instructor for help and to suggest more problems of this type that you could do for more practice. (Note that the practice exam is slightly longer than the actual exam will be.)
- Reviewing your notes and handouts – making sure that you understand the concepts studied in this course.
- Asking for help if you need it. We (your instructors) want to see you succeed and enjoy helping you. Our office hours for the week of March 5-11 will be:
    - Brooke (Bradley 1L):
        * Sunday: 3-5
        * Tuesday: 1-2, 4-5
        * Thursday: 11-1
        * Friday: 3-5
        * By appointment
    - Allison (Bradley 4):
        * Sunday: 3-5
        * Tuesday 1-2
        * Thursday: 11-1
        * Friday: 3-5
        * By appointment

Practice Final Exam

(1) Evaluate
$$\int \frac{\cos(x)\ln(\sin(x))}{\sin(x)}\, dx$$

(2) Evaluate
$$\int \arctan(x)\, dx$$

(3) Evaluate
$$\int \sec(x)\,(\tan(x)+\cos(x))\, dx$$

(4) Evaluate
$$\int_0^\pi \sin^3(x)\cos(x)\, dx$$

(5) Evaluate
$$\int x5^x\, dx$$

(6) Evaluate
$$\int \frac{1}{\sqrt{x^2-9}}\, dx$$

(7) Evaluate
$$\int \frac{1}{\sqrt{9-x^2}}\, dx$$

(8) Evaluate
$$\int \frac{x}{\sqrt{9+x^2}}\, dx$$

(9) Evaluate
$$\frac{d}{dx}\left(\int_{\sin(x)}^{\cos(x)} \ln(t)\, dt\right)$$

(10) Determine if the following improper integral converges. If it converges, evaluate it. Otherwise, explain why it diverges.
$$\int_1^\infty \frac{1}{x^2}\, dx$$

(11) According to Newton's law of cooling, the rate at which an object cools is directly proportional to the difference in temperature between the object and the surrounding environment. Using this information, derive a formula for the temperature $q(t)$ of on object at time t in terms of q_0 (the initial temperature of the object), q_e (the temperature of the environment), and c (the constant of proportionality.)

(12) An outdoor thermometer registers a temperature of 40 degrees F. Five minutes after it is brought into a room where the temperature is 70 degrees F, the thermometer registers 60 degrees F. When will it register 65 degrees F?

(13) Given a function, $f(x)$, defined on the interval $[1, 4]$, how do we define the definite integral of $f(x)$ from 1 to 4 : $\int_1^4 f(x)\, dx$?

(14) (a) Sketch the graph of the function $y = \sin(x)$ on the interval $[0, \pi]$.
     (b) Find the area of the region R bounded by $y = \sin(x)$ and the x-axis on the interval $[0, \pi]$.
     (c) Find the volume of the solid obtained by revolving R about the line $y = 2$.