Calculus III MA213:007–008

ANNOUNCEMENTS: A notebook is on reserve in the mathematics library in the basement of POT. This notebook will contain solutions to the exams and solutions to a few homework problems. As we begin integration, please take a few minutes to study the integral tables in the back of the textbook. It is an offence to not know ¹ the entries 1-17 on the integral table inside the back cover of the textbook. Violators will be cautioned and shown the yellow card. According to the course calendar, we will have an examination soon. The examination will cover \S 12.1-12.8, \S 13.1-13.4 and \S 13.6.

Assignments to be graded.

- (10 points) Homework K. §13.3 #40. Due Friday, 29 October 2004.
- (20 points) Homework L. §13.4 #20,§13.6 #8. Due Monday, 1 November 2004.

NOTEBOOK ASSIGNMENTS.

- §13.2 #1, 5, 9, 15, 23, 25, 26
- §13.3 #1, 3, 7, 12, 13, 15, 19, 21, 25, 39, 41.
- §13.4 #1, 3, 5, 9, 15, 16, 17, 21.
- §13.6 #1, 3, 5, 7, 9, 17.

TOPICS TO BE COVERED.

- §13.2 Compute iterated integrals over rectangles.
- §13.3 Compute iterated integrals over more general regions.
- §13.4 Evaluating integrals in polar coordinates.
- §13.6 Surface area as an integral.

AN AMUSEMENT: Criticize the following proof.

We consider the integral $\int \cos x \sin x \, dx$. If let $u = \cos x$ and $dv = \sin x \, dx$, and integrate by parts, we obtain

$$\int \cos x \sin x \, dx = -\cos^2 x - \int \sin x \cos x \, dx.$$

If we let $u = \sin x$ and $dv = \cos x \, dx$ and integrate by parts, we obtain

$$\int \cos x \sin x \, dx = \sin^2 x - \int \sin x \cos x \, dx.$$

If we set these two expressions for $\int \cos x \sin x \, dx$ equal to one another and simplify, we obtain

$$\sin^2 x + \cos^2 x = 0.$$

And hence that 1 = 0.

October 22, 2004

¹Know is defined to mean a) memorize the result and b) be able to explain why the result is true.