Math 120 Spring 2001

Quiz **4** BASIC CALCULUS II

Name: _____
Section: 8:30am or 10:30am (circle one)

Math 120
Wednesday February 28, 2001
Ron Buckmire
Alan Knoerr

Topic covered: Techniques of Integration

The point of this quiz is to illustrate your ability to evaluate intermediately difficult integrals.

Instructions:

1. Once you open the quiz, you have 50 minutes to complete it.
2. Where ever possible indicate your answer clearly, in the form of a sentence, showing all work necessary to understand your solution.
3. You may not use the book or any of your class notes, but you may use a calculator. You must work alone.
4. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one.
5. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
6. Relax and enjoy....
7. **This quiz is due on Friday, February 16**, at the beginning of class. NO LATE QUIZZES WILL BE ACCEPTED.

Pledge: I, _____, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

Math 120 Spring 2001 Quiz **4**

SHOW ALL YOUR WORK

1. This problem involves differentiation and anti-differentiation. **You may not use calculators on this quiz.**

(a) (*4 points*) Consider the following differentiation rules

$$(f(x)\cdot g(x))' = f'g + fg' \qquad \left(\frac{f(x)}{g(x)}\right)' = \frac{f'g - fg'}{g^2} \qquad [f(g(x))]' = f'(g(x))\cdot g'(x)$$

$$(a^x)' = a^x \cdot \ln(a) \qquad (e^x)' = e^x \qquad (x^n)' = nx^{n-1}$$

$$(\cos(x))' = -\sin(x) \qquad (\sin(x))' = \cos(x) \qquad (\ln(x))' = 1/x$$

Circle which of the above rules you have to use to prove that the equation below is true. In other words, indicate which rules you have to use to find the derivative of $f(x) = 2^{\sin(x)}$.

$$\frac{d}{dx}\left[2^{\sin(x)}\right] = 2^{\sin(x)}\cdot\cos(x)\cdot\ln(2)$$

(b) (*6 points*) Use the fact that you know that $f'(x) = 2^{\sin(x)}\cdot\cos(x)\cdot\ln(2)$ to evaluate the following integral exactly.

$$\int_0^{\pi/2} 2^{\sin(x)}\cdot\cos(x)\,dx =$$

You may need the following information to complete this question
$\sin(0) = \cos(\pi/2) = 0, \qquad \sin(\pi/2) = \cos(0) = 1.$