Math 120 Spring 98

Quiz 6

Basic Calculus 2

Name: _____

Date: _____

Time Begun: _____

Time Ended: _____

Friday March 27, 1998

Ron Buckmire

Topic covered: Improper Integrals

The idea behind this quiz is to give you more practice evaluating improper integrals and to review the inverse trigonometric function arctan(x).

Instructions:

1. Once you open the quiz, you have 60 minutes to complete it.

2. You may use the book or any of your class notes, and you may use a calculator. You must work alone.

3. 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.

4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.

5. Relax and enjoy...

6. **This quiz is due on Monday, March 30**, in 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.

1. (*2 points*) Compute the derivative of $f(x) = \arctan(2x)$. (The inverse of the trigonometric function $\tan(x)$ is known as $\arctan(x)$.)

2. (*4 points*) Your answer above should assist you in finding the antiderivative of $\dfrac{4}{1 + (2x)^2}$. That is, evaluate the following integral.

$$\int \frac{4}{1 + 4x^2}\, dx =$$

3. (*4 points*) Use your answer from (2) to determine whether the following improper integral converges to a finite value or not. If it converges, compute its value *exactly*.

$$\int_0^\infty \frac{4}{1 + 4x^2}\, dx =$$