Last Name:
First Name:
Instructor:

Math 150
Group Final (Fall 2004)

This is the part of the Math 150 Final Exam that is common to all sections.

You are not allowed to use notes, books, calculators, personal stereos or cell phones.

You have exactly one hour. You will not be handed the second part of the exam before 9 AM. If you finish this part before 9 AM, hand in your paper to the proctor and remain in your seat.

Points

1._____**/8**

2._____**/8**

3._____**/8**

4._____**/8**

5._____**/8**

6._____**/6**

7._____**/8**

8._____**/10**

9._____**/8**

10._____**/8**

11._____**/10**

12._____**/10**

In problems 1 - 5, determine or evaluate the derivative as indicated. Simplify your response as much as possible.

1. (8 pts.)

$$\frac{d}{dx}\left(x^2 \arctan\left(x\right)\right)$$

2. (8 pts.)

$$\frac{d}{dx}\left(\frac{x^2-1}{x^2+4}\right)$$

3. (8 pts.)

$$\frac{d}{dx}\int_{\pi}^{x} e^{\cos^2(t)}dt$$

4. (8 pts.)

$$\frac{d}{dx}\sqrt{1+\sin^2(x)}$$

5. (8 pts.)

$$\frac{d}{dx}\sinh(x)\Big|_{x=\ln(2)}$$

6 (6 pts.) Determine

$$\lim_{x\to 4}\frac{x^2-9}{x-2}$$

7. (8 pts.) Determine

$$\lim_{x \to \pi/2+} \frac{\sin^2(x)}{\cos(x)}$$

8 (10 pts.) Use L'Hospital's Rule to determine

$$\lim_{x \to +\infty} \left(1 + x^2\right)^{1/x}.$$

In problems 9 and 10, determine the indefinite integral.

9. (8 pts.)

$$\int x\sqrt{1+x^2}dx$$

10. (8 pts.)

$$\int \frac{\cos(x)}{1+\sin^2(x)}dx$$

In problems 11 and 12, evaluate the definite integrals. Simplify as much as possible.

11. (10 pts.)

$$\int_{1/2}^{1} \frac{d}{dx} \left(\arcsin\left(x\right)\right) dx$$

12. (10 pts.)

$$\int_{1}^{e} \frac{\ln^2\left(x\right)}{x} dx$$