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Exam #1, September 30, Calculus II (109), Fall, 2009, W. Stephen Wilson

I agree to complete this exam without unauthorized assistance from any person, materials or device.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

TA Name and section: \_\_\_\_\_

**NO CALCULATORS, NO PAPERS, SHOW WORK.** (22 points total)

1. (3 points) Compute  $\int \sin^{-1}(x)dx$ . Show work.

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2. (3 points) Compute  $\int \cos^3(x)dx$ . Show work.

3. (3 points) Compute  $\int \frac{du}{u^2\sqrt{1-u^2}}$ . Show work.

4. (3 points) Compute  $\int \frac{dx}{(x+1)(x^2+2x+2)}$ . Show work.

5. (3 points) Solve for  $y$  in  $y' = x/y$ . Show work.

6. (3 points) Solve for  $y$  in  $y' + y = 2e^x$ . Show work.

7. (4 points) Before class starts there is no hot air in the room. The professor blows hot air at the rate of  $1 \text{ ft}^3/\text{minute}$ . The students are only able to absorb the Professor's hot air at the rate of 50% of the hot air in the room per minute. (3 points) Find a formula for the amount of hot air in the room at the end of a 50 minute class. (1 point) If the professor never quits, what is the limit of the hot air in the room? (Assuming that it never cools.)