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Exam #1, September 29, Calculus II (109), Fall, 2010, W. Stephen Wilson

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

Name (legible): \_\_\_\_\_ Date: \_\_\_\_\_

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

**NO CALCULATORS, NO PAPERS, NO PARTIAL CREDIT, SHOW WORK.** (29 points total)

1. (5 points) Compute  $\int x f''(x) dx$  in terms of  $f(x)$  and  $f'(x)$ . Show work.

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

3. (3 points) Write  $\frac{1}{(x+1)(x^2+x+1)}$  in terms of partial fractions. Show work.

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

5. (4 points) Find the family of curves perpendicular to the family of curves given by  $y^2 + \frac{x^2}{2} = C$ .

6. (4 points) Solve for  $y$  in  $y' = x + y$ . Show work.

7. (7 points) We have 1 liter of water with .05 Kg. of salt in it. We add fresh water (no salt) at the rate of  $1 \text{ cm}^3/\text{sec}$ . We assume instant mixing. We drain water at the same rate. Find a formula for the amount of salt in the liter as a function of time in seconds. (4 points) Find a formula for the time,  $t$ , when there is .02 Kg. of salt in the liter. (2 points) If you have the correct answer there, I'll give you an extra point if you can guess the number of seconds in this answer within 300 seconds.(1 point)