pages	$1-5$	$6-9$	$10-15$	*total*
scores				

Exam #2, October 28, Calculus I, Fall, 2006, 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. (60 points total)

The $\sin^2(u)$ isn't particularly important in these first problems. The function $f(x)$ is always assumed to be continuous.

1. (3 points) Compute $\frac{d}{dx}\int_0^x \sin^2(u)du$.

2. (3 points) Compute $\frac{d}{dx}\int_0^{x^2} \sin^2(u)du$.

3. (3 points) Compute $\frac{d}{dx}\int_{x^2}^{0} \sin^2(u)du$.

4. (3 points) Compute $\frac{d}{dx}\int_{x^2}^{x^3} \sin^2(u)du$.

5. (3 points) Compute $\int_0^1 \frac{dx}{1+x^2}$.

6. (3 points) Find the area under one hump of the curve $y = \sin(x)$.

7. (3 points) What is the average value of one hump of $\sin(x)$?

8. (3 points) What is $\int x^n dx$ for $n \neq -1$?

9. (3 points) What is $\int \frac{dx}{x}$?

10. (3 points) What is $\int \frac{dx}{\sqrt{x}}$?

11. (3 points) What is $\int \cos(2x)dx$?

12. (3 points) If $f(x) > 0$, what is the integral for the area under f and above the x-axis from a to b, $a < b$?

13. (3 points) If $f(x) > 0$, what is the integral for the volume of the solid of revolution obtained by rotating the area under f and above the x-axis from a to b, $a < b$ about the x-axis?

14. (3 points) What is the area trapped between the function $f(x)$ and the x-axis between a and d, $a < d$.

15. (3 points) Set up the integral for the area inside a circle of radius a. (Do not try to integrate it.)

16. (3 points) What is the integral for the length of the curve $y = f(x)$ from a to b, $a < b$?

17. (3 points) Set up the integral for the length of $y = x^2$ from $x = 0$ to $x = 1$.

18. (3 points) Set up the integral for the solid of revolution for the area between $y = x$ and $y = x^2$ between $x = 0$ and $x = 1$ when it is rotated about the x-axis.

19. (3 points) Set up the integral for the solid of revolution for the area between $y = x$ and $y = x^2$ between $x = 0$ and $x = 1$ when it is rotated about the line $x = -1$.

20. (3 points) If your speed is given by $t^3 - 1$, how far do you go from time 1 to time 2?