

Exam #1, Nov. 2, Fall 1999, Calculus II (Eng) 110.109, W. Stephen Wilson

No books, no calculators, no crib sheets, show all work!

Name: _____

0. (2 points, 1 point for recognizability and 1 for last name spelled correctly)

TA Name: _____

1. (2 points) State the formula for integration by parts.

2. (3 points) Set up an integral (in Cartesian coordinates) for the area of the circle of radius a at the origin.

3. (3 points) Do the first substitution, simplify, but do not evaluate:

$$\int \sqrt{r^2 - x^2} dx.$$

4. (3 points) Give a brief sketch of $r = 1 - \cos(\theta)$ in polar coordinates.

5. (3 points) Do not use the half angle formula. Integrate:

$$\int \cos^2(x) dx$$

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6. (3 points) Find the point (in polar coordinates) where x is maximum and above the x -axis for $r = 1 - \cos(\theta)$.

7. (3 points) Set up the integral for the area enclosed by $r = 1 - \cos(\theta)$ above the x -axis. Do not integrate.

8. (3 points) Set up the integral for the length of the curve $r = 1 - \cos(\theta)$ above the x -axis. Do not integrate.

9. (3 points) Give parametric equations which give the circle $x^2 + y^2 = a^2$.

10. (3 points) As x goes to zero what is the limit of:

$$\frac{e^x - 1 - x - x^2/2}{x^3}.$$

Discuss and evaluate the following two integrals.

11. (3 points)

$$\int_0^1 \frac{dx}{x}$$

12. (3 points)

$$\int_0^1 \frac{dx}{\sqrt{x}}$$