Math 550 Mar 29, 2002
Vector Analysis
Spring 2002, USC

Midterm 2

Time: 50min

Choose 5 problems.

1. Find the center of mass of a half disk of radius 1.

2. Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

3. Evaluate $\int_{-\infty}^{\infty} e^{-x^2}\, dx$.

4. Evaluate $\int_0^{\pi} \int_y^{\pi} \frac{\sin x}{x}\, dx\, dy$

5. Compute the total mass of a spherical shell of inner radius 1 and outer radius 2 if density of the shell at each point is equal to the distance of that point from the origin.

6. Set up (but do not evaluate) a triple integral corresponding to the volume of the terahedron with vertices $(0,0,0)$, $(1,0,0)$, $(0,2,0)$, and $(0,0,3)$.

7. Use the change of variables formula to prove that if we rescale each coordinate axis in R^3 by a factor of 2, then the volume of each solid object changes by a factor of 8.

Each problem is worth 20pts.

LaTeX ..... $\mathcal{MG}$