

Math 13 Fall 2008: Exam 3

Name:

Instructions: There are 5 questions on this exam of which you must do 4. Each problem is scored out of 8 points for a total of 32 points. You may not use any outside materials(eg. notes or calculators). You have 50 minutes to complete this exam. Remember to fully justify your answers.

Score:

Circle below the 4 problems you wish to be graded. Otherwise, I will grade the first 4 completed problems

1 2 3 4 5

Problem 1. Evaluate

$$\int_0^1 \int_{y^{1/3}}^1 \frac{1}{\sqrt{1+x^4}} dx dy$$

Problem 2. Find the mass of the ice cream cone bounded by $x^2 + y^2 + z^2 = 18$, $z = \sqrt{x^2 + y^2}$, $z = 0$ if the density is given by $\delta = \rho$.

1. Set up the integral in both spherical and cylindrical coordinates.
2. Evaluate one of the two integrals.

Problem 3. Find the volume of the part of the ellipsoid $4x^2 + 9y^2 + z^2 = 6$ inside the elliptic paraboloid $z = 4x^2 + 9y^2$.

Problem 4. Find the volume above the upper sheet of the hyperboloid $x^2 + y^2 = z^2 - 1$ and below the plane $z = 3$.

Problem 5. Find the moment of inertia about the z -axis for the part of the sphere $x^2 + y^2 + z^2 = 4$ in the first octant if the density is given by $\delta = 15$.