

Name: _____

Math 251 Calculus III – Crawford

Take-Home Quiz 4

Due: Tuesday, May 9, 2017 by 2:30pm.

Books, notes, and calculators *are* allowed. You are allowed to work with each other and to get help from the tutors, but you cannot get help from me. **You must show all your work.** [Scores will be scaled to 20 points after grading.] Good luck!

1. (8 pts) Evaluate the iterated integral. Show all work and intermediate steps.

$$\int_0^{\pi} \int_0^{y/2} \int_0^{1/y} \sin y \, dz \, dx \, dy$$

2. (8 pts) Given the following iterated integral, rewrite it in the order $dx \, dz \, dy$.

[Do not evaluate.]

$$\int_0^2 \int_{2x}^4 \int_0^{\sqrt{y^2-4x^2}} x^2 y \, dz \, dy \, dx$$

3. (8 pts) Use cylindrical coordinates to set-up, but do NOT evaluate the integral to find the volume of the solid in the first octant that lies below $z = 3 - 2(x^2 + y^2)$ and above $z = \sqrt{x^2 + y^2}$.

4. (8 pts) Change the following integral to spherical coordinates, but do NOT evaluate it.

$$\int_{-4}^4 \int_0^{\sqrt{16-x^2}} \int_0^{\sqrt{16-x^2-y^2}} \sqrt{x^2 + y^2} \, dz \, dy \, dx$$