Calculus 3 July 5, 2016

1. Like last time set but now evaluate the integral which computes the volume bounded by the paraboloids $z = 1 - x^2 - y^2$ and $z = x^2 + y^2 - 1$
2. Evaluate $\int\int_R (3x + 4y^2) dA$ where R is the region in the upper half plane bounded by the circles $x^2 + y^2 = 1$ and $x^2 + y^2 = 4$.
3. Use a double integral to find the area enclosed by $r = \cos(3\theta)$
4. Find the volume of the solid that lies under the paraboloid $z = x^2 + y^2$ above the xy-plane and inside the cylinder $x^2 + y^2 = 2x$.
5. Suppose electric charge is distriputed over the disk of radius 2 meters. If the charge density is equal to the distance from the center of the disk measured in coulombs per square meter. Find the total charge on the disk.
6. Evaluate $\int\int\int_B xyz^2 dV$, where B is the rectangular box given by
$$B = \{(x, y, z) \mid 0 \leq x \leq 1, -1 \leq y \leq 2, 0 \leq z \leq 3\}$$
7. Evaluate $\int\int\int_E z dV$ where E is the solid tetrahedron bounded by the four planes $x = 0, y = 0, z = 0$, and $x + y + z = 1$
8. Evauluate $\int\int\int_E z dV$ where E is the region bounded by the paraboloid $y = x^2 + z^2$ and the plane $y = 4$
9. Rewrite
$$\int_0^1 \int_0^{x^2} \int_0^y f(x, y, z) dz dy dx$$
such that you integrate first with respect to x, then z, then y
10. Use a triple integral to find the volume of the tetrahedron T bounded by the planes $x+2y+z = 2, x = 2y, x = 0$, and $z = 0$
11. Express the volume of the E 4 different ways, where E is the surface bounded by
$$y = x^2, z = 0, y + 2z = 4$$
12. Evaluate the triple integral, $\int\int\int_E dV$ where E is the surface bounded by
$$x^2 + y^2 + z^2 = 4$$