Practice for Quiz 12
Math 2580
Spring 2016

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If you can answer the following problems, you should be well-prepared for Quiz 12:

1. For the following double integral, sketch the region of integration, change the order of integration, and evaluate:
$$\int_1^4 \int_1^{\sqrt{x}} (x^2 + y^2)\, dy\, dx.$$

2. Evaluate the integral $\iiint_B x^2\, dV$, where $B = [0,1] \times [-1,1] \times [0,1]$.

3. Write the integral $\iiint_W f(x,y,z)\, dV$, where W is the region between the cone $z = \sqrt{x^2+y^2}$ and the paraboloid $z = x^2+y^2$, as an interated integral. (Start by describing W using inequalities of the form $g_1(x,y) \leq z \leq g_2(x,y)$, where $(x,y) \in D$, and then describe D as either a Type 1 or Type 2 region.)

4. Evaluate the integral $\iiint_W z\, dV$, where W is the region bounded by the cylinder $x^2 + y^2 = 4$ and the planes $z = 0$ and $z = 1$.

5. Describe the surfaces given in cylindrical coordinates by (i) $r = 3$, (ii) $\theta = \pi/4$, and (iii), $z = 2$.

6. Express the surface $z = x^2 + y^2$ in spherical coordinates.