Math 251 **Workshop 10: Triple integrals: do me a solid**

November 4, 2013

Due: November 6, 2013 Name: _____

1 Workshop 10: Triple integrals: do me a solid

This workshop gives you a chance to practice setting up triple integrals.

1.1 Integrals: do me a solid

1. Let E be the region under the plane $2x + 3y + z = 6$ that lies in the first octant. Draw the region. In this case, I suggest drawing the plane by first drawing the points where it intersects the coordinate axes, and then drawing the triangle these points determine. Evaluate the integral
$$\iiint_E x \, dV$$
in the order $dz\, dy\, dx$, verifying that the result is $9/2$. In your figure, make sure to draw a typical slice containing a typical segment.

2. Describe the regions expressed by the iterated integrals.

(a) $\int_{-2}^{4}\int_{2}^{6}\int_{0}^{5} f(x,y,z)\,dy\,dx\,dz$

(b) $\int_{0}^{3}\int_{0}^{3}\int_{0}^{3-y} f(x,y,z)\,dz\,dy\,dx$

(c) $\int_{0}^{2}\int_{0}^{3}\int_{4x/3}^{4} f(x,y,z)\,dz\,dx\,dy$

(d) $\int_{-3}^{3}\int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}}\int_{-\sqrt{9-x^2-y^2}}^{\sqrt{9-x^2-y^2}} f(x,y,z)\,dz\,dy\,dx$

(e) $\int_{-3}^{3}\int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}}\int_{-3}^{3} f(x,y,z)\,dz\,dy\,dx$