Bonus Homework 1 Calculus 3 10/11/05

Each problem is worth zero points... this time.

1. Set up an iterated integral for the volume of the region beneath the surface $z = 9 - x^2 - y^2$ and above the rectangle in the xy-plane with vertices at the origin, (2,0), (2,1), and (0,1).

$$\int_0^1\int_0^2 \left(9 - x^2 - y^2\right) dx\, dy$$

2. Set up an iterated integral for the volume of the region beneath the surface $z = 9 - x^2 - y^2$ and above the triangle in the xy-plane with vertices at the origin, (2,0), and (0,1).

$$\int_{x=0}^{x=2}\int_{y=0}^{y=1-\frac{1}{2}x} \left(9 - x^2 - y^2\right) dy dx$$

3. Set up an iterated integral for the volume of the first-octant portion of a sphere with radius 5.

$$\int_0^5\int_0^{\sqrt{25-x^2}}\int_0^{\sqrt{25-x^2-y^2}} 1 dz dy dx$$

4. Set up an iterated integral for the volume of the region bounded by the surface $z = 4 - x^2$, the xy-plane, the xz-plane, and the plane $x + y = 4$.

$$\int_{-2}^{2}\int_0^{4-x}\int_0^{4-x^2} 1 dz dy dx$$

5. Set up an iterated integral for the volume of the region bounded below by the surface $z = x^2$ and above by the surface $z = 9 - y^2$.

$$\int_{-3}^{3}\int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}}\int_{x^2}^{9-y^2} 1 dz dy dx$$

6. Set up an iterated integral for the volume of the region bounded by the hyperboloid of two sheets $z^2 - x^2 - y^2 = 1$ and the plane $z = 2$.

$$\int_{-\sqrt{3}}^{\sqrt{3}}\int_{-\sqrt{3-x^2}}^{\sqrt{3-x^2}}\int_{\sqrt{1+x^2+y^2}}^{2} 1 dz dy dx$$