MA 213 Worksheet #16

Sections 15.6 and 15.7

1 *15.6.15* Evaluate the integral $\iiint_T y^2 V$, where T is the solid tetrahedron with vertices $(0,0,0)$, $(2,0,0)$, $(0,2,0)$ and $(0,0,2)$.

2 *15.6.21* Use a triple integral to find the volume of the solid enclosed by the cylinder $y = x^2$ and the planes $z = 0$ and $y + z = 1$.

3 *15.7.1* Plot the point whose cylindrical coordinates are given. Then find the rectangular coordinates of the point.

(a) $(4, \pi/3, -2)$

(b) $(2, -\pi/2, 1)$

4 *15.7.3* Change from rectangular to cylindrical coordinates.

(a) $(-1, 1, 1)$

(b) $(-2, 2\sqrt{3}, 3)$

5 Use cylindrical coordinates to evaluate the following integrals.

15.7.17 $\iiint_E \sqrt{x^2 + y^2}\, dV$ where E is the region that lies inside the cylinder $x^2 + y^2 = 16$ and between the planes $z = -5$ and $z = 4$.

15.7.19 $\iiint_E (x + y + z)\, dV$, where E is the solid in the first octant that lies under the paraboloid $z = 4 - x^2 - y^2$.

Additional Recommended Problems

6 *15.6.13* Evaluate the triple integral:

$$\iiint_E 6xy \; dV,$$

where E is the (three dimensional) region that lies under the plane $z = 1 + x + y$ and above the (two dimensional) region in the xy-plane that is bounded by the curves $y = \sqrt{x}$, $y = 0$ and $x = 1$.

7 *15.7.21* Evaluate $\iiint_E x^2\, dV$, where E is the solid that lies within the cylinder $x^2 + y^2 = 1$, above the plane $z = 0$, and below the cone $z^2 = 4x^2 + 4y^2$.

8 *15.7.29* Evaluate the integral by changing to cylindrical coordinates.

$$\int_{-2}^{2} \int_{-\sqrt{4-y^2}}^{\sqrt{4-y^2}} \int_{x^2+y^2}^{2} xz \; dz \; dx \; dy.$$