

MA 213 Worksheet #19

Section 15.6

11/1/18

1 15.6.3 Evaluate the following iterated integrals: $\int_0^2 \int_0^{z^2} \int_0^{y-z} (2x - y) dx dy dz$

2 15.6.9,13,15 Evaluate the following triple integrals:

(a) $\int \int \int_E y dV$, where $E = \{(x, y, z) | 0 \leq x \leq 3, 0 \leq y \leq x, x - y \leq z \leq x + y\}$

(b) $\int \int \int_E 6xy dV$, 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 $x = 1$.

(c) $\int \int \int_T y^2 dV$, where T is the solid tetrahedron with vertices $(0, 0, 0)$, $(2, 0, 0)$, $(0, 2, 0)$ and $(0, 0, 2)$.

3 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 $y + z = 1$.

4 15.6.27,35

(a) Sketch the solid whose volume is given by the integral $\int_0^1 \int_0^{1-x} \int_0^{2-2z} dy dz dx$

(b) Write the five other iterated integrals that are equal to the following iterated integral:
 $\int_0^1 \int_y^1 \int_0^y f(x, y, z) dz dx dy$

5 15.6.37 Evaluate the following triple integral using only geometric interpretation and symmetry,

$$\int \int \int_C (4 + 5x^2yz^2) dV, \text{ where } C \text{ is the cylindrical region } x^2 + y^2 \leq 4, -2 \leq z \leq 2$$

6 15.6.41 Find the mass and center of mass of a solid tetrahedron bounded by the planes $x = 0$, $y = 0$, $z = 0$ and $x + y + z = 1$ with density function $\rho(x, y, z) = y$.

7 15.6.43 Find the moments of inertia for a cube with side length L , one vertex at the origin and three edges along the coordinate axes and constant density k .