

## Homework Section 15.6

1. Evaluate the iterated integrals:

a)  $\int_{-1}^1 \int_0^2 \int_0^1 (xz - 3y^2) dz dy dx$

b)  $\int_0^4 \int_0^1 \int_0^{\sqrt{1-z^2}} ze^x dy dz dx$

2. Evaluate the triple integrals:

a)  $\iiint_Q yz \sin(x^5) dV$ , given  $Q = \{(x, y, z) \mid 0 \leq x \leq 1, 0 \leq y \leq x, x \leq z \leq 2x\}$

b)  $\iiint_Q 2xy dV$ , given  $Q$  is the solid tetrahedron with vertices  $(0, 0, 0)$ ,  $(2, 0, 0)$ ,  $(0, 1, 0)$ , and  $(0, 0, 4)$ .

c)  $\iiint_Q (2x + y) dV$ , given  $Q$  is bounded by the cylinder  $y = x^2$  and the planes  $y = z$ ,  $x = y$ , and  $z = 0$ .

d)  $\iiint_Q y dV$ , given  $Q$  is bounded by the paraboloid  $y = 3x^2 + 3z^2$  and the plane  $y = 3$ .

3. Use a triple integral to find the volume of the given solid:

a) The solid enclosed by the cylinder  $x = y^2$  and the planes  $z = 0$ ,  $z = 4$ , and  $x = 9$ .

b) The solid surrounded by the cylinder  $x^2 + y^2 = 4$  and the planes  $y + z = 5$  and  $z = 1$ .

4. Sketch the solid whose volume is given by the iterated integral:

a)  $\int_0^1 \int_0^{1-y} \int_0^{3-3z} dx dz dy$

b)  $\int_0^1 \int_0^{1-y} \int_0^{1-y^2} dx dz dy$

5. Consider the iterated integral  $\int_{-1}^1 \int_{x^2}^1 \int_0^{2-2y} f(x, y, z) dz dy dx$ . Rewrite this integral as an equivalent integral in the five other orders.