

1. Double Integrals over General Regions

(a) $\int \int_D (x + y) dA$ where D is the triangle with vertices $(0,0)$, $(0,2)$, and $(1,2)$.

(b) $\int \int_D 48xy dA$ where D is the region bounded by $y = x^3$ and $y = \sqrt{x}$.

2. Reverse Order of Integration

(a) $\int_1^2 \int_x^{x^3} f(x, y) dy dx + \int_2^8 \int_x^8 f(x, y) dy dx$

(b) $\int_0^1 \int_{x^2}^1 \sqrt{y} \sin(y) dy dx$

3. Find Volume of solid

(a) Tetrahedron in first octant bounded by coordinate planes $z = 7 - 3x - 2y$. Hint: To find D , let $z = 0$ to get the projection onto the xy plane.

4. Polar Double Integrals

(a) $\int_0^{\pi/2} \int_1^3 r e^{-r^2} dr d\theta$

Answer: $-\frac{1}{4}e^{-9}\pi + \frac{1}{4}e^{-1}\pi$

5. Convert from Cartesian to Polar

(a) Find $\int \int_D xy dA$ where D is the region bounded by the x -axis, the line $y = x$, and the circle $x^2 + y^2 = 1$

(b) Find the volume of the solid bounded by $z = 4 - x^2 - y^2$ and the xy -plane. Hint: to find D , set $z = 0$ to get the projection onto the xy plane.