

exercise 1:

Exercise 5.5.

exercise 2:

Exercise 5.6: integrate the constant 1 to find the area of this region.

exercise 3:

Consider the rose petal with equation in polar coordinates  $r = 2 \cos 2\theta$ . Compute the area of a half petal. Hint: you just need to consider the range  $0 \leq \theta \leq \frac{\pi}{4}$ .

exercise 4:

Find the volume of the solid in space bounded by the surfaces with equation  $z = x^2, y = x^2, y = 1$  and the  $xy$  plane.

exercise 5:

Let  $R$  be the region in  $\mathbb{R}^2$  bounded by the hyperbolas with equation  $y = \frac{1}{x}$  and  $y = \frac{2}{x}$  and the lines with equation  $y = 1$  and  $y = 2$ . Define the mass density  $m(x, y) = 4(x + y)$  on  $R$ . Find the center of mass of  $R$ .

exercise 6:

Integrate  $x(z + 1)$  over the region in space defined by  $1 \leq x \leq \sqrt{5}, x^2 - y^2 \geq 1, 1 \leq z \leq 3$ .

exercise 7:

Integrate  $e^{z+\sqrt{x^2+y^2}}$  over the region in space defined by  $1 \leq x^2+y^2 \leq 4, y \leq 0, x \leq \sqrt{3}y, 2 \leq z \leq 3$ .