

Book Problems:

- Section 3.7, Exercises 2, 12, 18, 22
- Section 4.3, Exercises 2, 6, 8, 20, 24
- Section 4.4., Exercises 6, 8, 10
- Section 4.5, Exercises 2, 4, 8, 10, 14, 20

Additional Problems:

A1. Volume of a Sphere. Consider the sphere of radius r centered at the point $(0, 0, 0)$. In order to compute the volume we can think of the sphere as made of as infinitely many thin cylinders stacked together. At each x value between $-r$ and r there is a thin cylinder with radius $\sqrt{r^2 - x^2}$ and height dx . The volume of this cylinder is $\pi(\sqrt{r^2 - x^2})^2 dx = \pi(r^2 - x^2)dx$. To obtain the volume of the sphere we “add up” the volumes of all the cylinders:

$$\text{volume of a sphere} = \int \text{volume of thin cylinders} = \int_{-r}^r \pi(r^2 - x^2) dx.$$

Evaluate the integral.