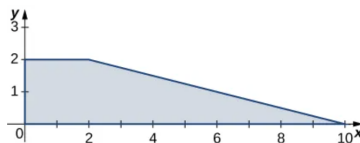


## 18 10-30-2025

### 18.1 Section 5.6, Exercise 301

*computation to final answer left to you all :-)* In the following exercises, the region  $R$  is the trapezoidal region determined by the lines  $y = \frac{1}{4}x + \frac{5}{2}$ ,  $y = 0$ ,  $y = 2$ , and  $x = 0$ . Find the mass of  $R$  with the density function  $\rho(x, y) = 3xy$ .



### 18.2 Section 5.6, Exercise 346

*computation to final answer left to you all :-)* The solid  $Q$  is bounded by the cylinder  $x^2 + y^2 = a^2$ , the paraboloid  $b^2 - z = x^2 + y^2$ , and the  $xy$  plane, where  $0 < a < b$ . Find the mass of the solid if its density is given by  $\rho(x, y, z) = \sqrt{x^2 + y^2}$ .

### 18.3 Section 5.6, Example 5.62

*try different orders of integration - you should get same answer regardless* Suppose that  $Q$  is a solid region bounded by  $x + 2y + 3z = 6$  and the coordinate planes and has density  $\rho(x, y, z) = x^2yz$ . Find the total mass.

### 18.4 Challenge: Section 5.6, Exercise 343

The mass of a solid  $Q$  is given by

$$\int_0^{2\sqrt{2}} \int_0^{\sqrt{8-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{16-x^2-y^2}} (x^2 + y^2 + z^2)^n dz dy dx$$

where  $n$  is an integer. Determine  $n$  such that the mass of the solid is  $(2 - \sqrt{2}) \cdot \pi$ .