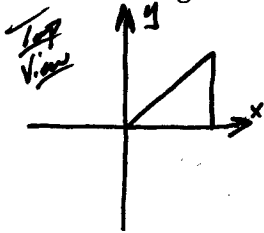


You are encouraged to work in groups of two to four on this assignment and make a single group submission. Each problem is worth 5 points for correct and clearly justified answers.

1. Set up an iterated integral and evaluate it to find the volume of a pyramid with height  $h$  and square base with side length  $b$ .



*Position the pyramid with its vertex directly above the origin and lined up with the axes, and focus on the portion shown at left.*

$$\text{Volume} = \int_0^{b/2} \int_0^x \int_0^{h - \frac{2h}{b}x} 1 \, dz \, dy \, dx$$

$$= \frac{1}{3} b^2 h$$

2. Set up iterated integrals and evaluate them to find the center of mass of a pyramid (having uniform density) with height  $h$  and square base with side length  $b$ .

*Symmetry should make  $\bar{x} = \bar{y} = 0$ , and  $\bar{z}$  the same as for the part in #1, so:*

$$\bar{z} = \frac{\int_0^{b/2} \int_0^x \int_0^{h - \frac{2h}{b}x} k \cdot z \, dz \, dy \, dx}{\int_0^{b/2} \int_0^x \int_0^{h - \frac{2h}{b}x} k \, dz \, dy \, dx} = \frac{\frac{b^2 h^2 k}{96}}{\frac{b^2 h k}{24}} = \frac{h}{4}$$