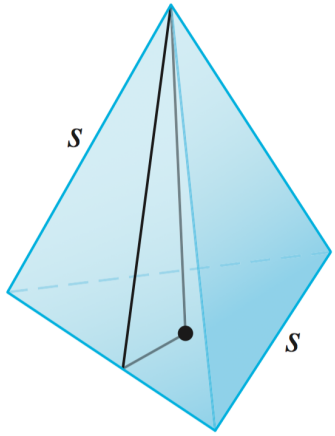
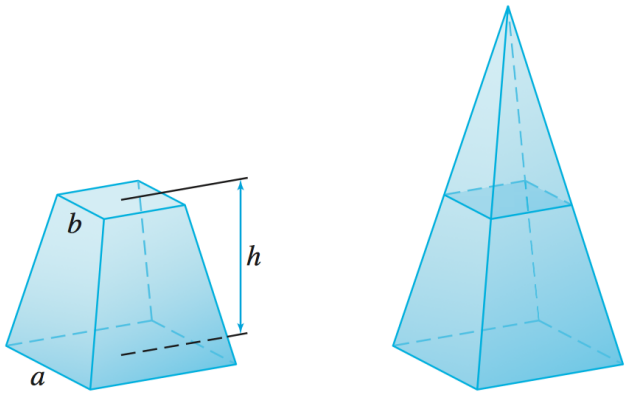
§6.2 (SETTING UP INTEGRALS) NAME: _____

3 July 2018

(1) Find the volume of a *regular* tetrahedron whose faces are equilateral triangles of side length s.



(2) A frustum of a pyramid is a pyramid with its top cut off. Let V be the volume of a frustum of height h whose base is a square of side length a and whose top is a square of side length b with $a > b \geq 0$.



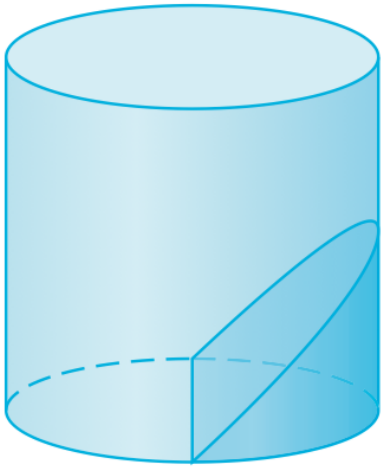
(A) (B)

(a) Show that if the frustum were continued to a full pyramid, it would have height $\dfrac{ha}{a-b}$.

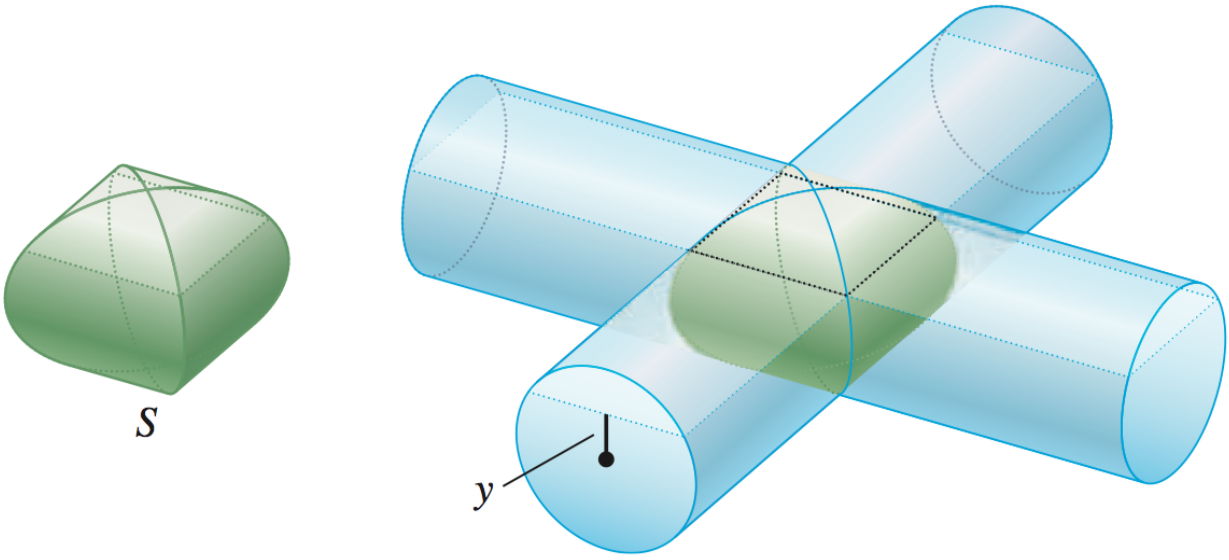
(b) Calculate the side length of a cross-section of the frustum at height x from the base.

(c) Calculate the volume of the frustum.

(3) A plane inclined at an angle of 45° passes through a diameter of the base of a cylinder of radius r. Find the volume of the region within the cylinder and below the plane.



(4) The solid S below is the intersection of two cylinders of radius r whose axes are perpendicular.



(a) The horizontal cross-section of each cylinder at a distance y from the central axis is a rectangular strip. Find the area of the horizontal cross-section of S at distance y from the central axis.

(b) Find the volume of S as a function of r.