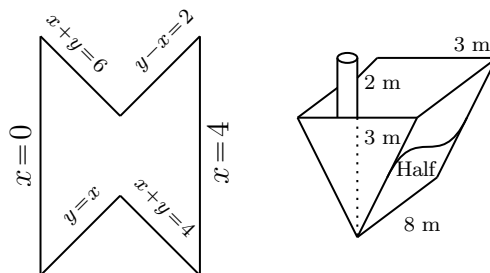


Consider the following figures:



**Exercise 1.** The figure on the left describes a cross-section of a solid of revolution bounded by the curves  $\{y=x, x+y=6\}$ ,  $x \in [0, 2]$ , and  $\{x+y=4, y-x=2\}$ ,  $x \in [2, 4]$ .

The density for such a cross section is given by the equation  $\rho(y) = 1 - 3y$ . Express the mass of the solid of revolution obtained after rotating about the axis  $y=8$  as a sum of integrals.

[You may use any method, in any case your answer will involve more than one integral.]

**Exercise 2.** The figure on the right describes a tank filled up to half of the total height with water ( $\rho = 1000 \text{ kgm}^{-3}$ ). Find the work required to pump out the water from the tank.