1. A long shed is created by constructing a front frame with the shape \( y = H \sin(x) \), for \( 0 \leq x \leq \pi \) m, and extending this shape with a length \( L \). Sketch the shed and a representative slice that you could use to find the volume by integration. Set up the integral and find the volume of the shed. (3 points)

2. One model for the shape of a space station is a donut shape that spins, so that in the ring there is a perceived "gravity" pulling outwards. Suppose that such a space station is given by the graph of \((x - 3)^2 + y^2 = 1\) (where all units are, of course, "space station length units," sslus), rotated around the \( y \)-axis. Set up an integral to find the volume enclosed by such a space station. (3 points)

3. Sketch the graphs of the curves given in polar coordinates by \( r = 1 + \sin(\theta) \) and \( r = \sin(\theta) \). If we want to find the area inside \( r = 1 + \sin(\theta) \) but outside of \( r = \sin(\theta) \), sketch an appropriate "slice." Set up an integral to find this area. (3 points)