MATH 116-023 QUIZ 6 / 21 Feb 2006 Name:______________________________

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1. A long shed is created by constructing a front frame with the shape $y = H\sin(x)$, for $0 \le x \le \pi$ 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)

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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)

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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)