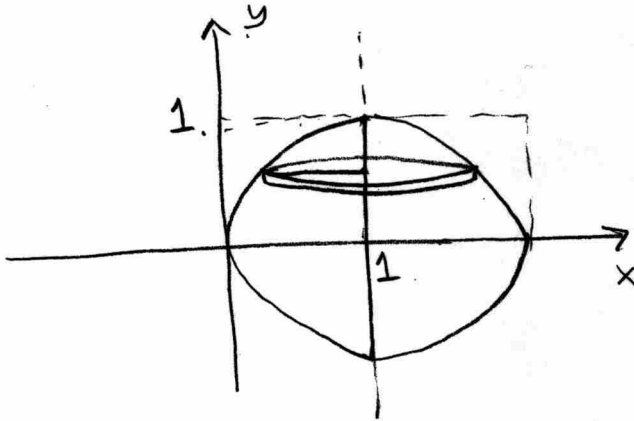


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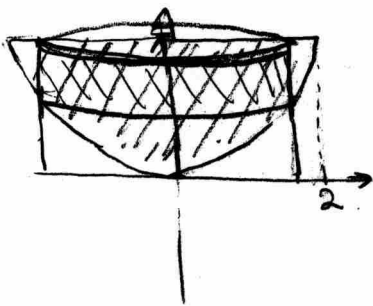
19. Sketch the region enclosed by the curves  $x = y^2$ ,  $x = 1$ . Label the axes, and show the scaling. Draw a typical approximating disk, according to whether you will integrate with respect to  $x$  or  $y$  to find the volume of revolution obtained by rotating the region about the line  $x = 1$ . Set up an integral that gives the volume. **Do not evaluate the integral.**



8 pts

$$V = \int_{-1}^1 \pi (1 - y^2)^2 dy$$

20. **Extra credit:** Use the method of cylindrical shells to find the volume of the solid generated by rotating about the  $y$ -axis the region bounded by the curves  $y = x^2$ ,  $y = 4$ , and  $x = 0$ , for  $0 \leq x \leq 2$ . Sketch the region and a typical shell.



8 pts

$$\begin{aligned} V &= \int_0^2 2\pi \cdot x \cdot (4 - x^2) dx \\ &= 2\pi \left[ \frac{4x^2}{2} - \frac{x^4}{4} \right]_0^2 \\ &= 2\pi (8 - 4) \\ &= 8\pi \end{aligned}$$