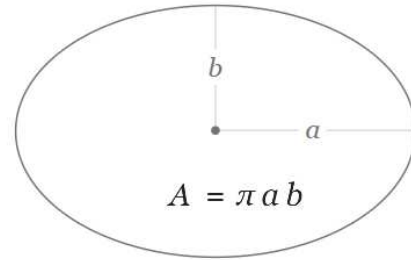


YOUR NAME: _____

George Voutsadakis

Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

You will need the formula for the area of an ellipse shown in the figure. Recall that the axis of length $2a$ is called the major axis and the axis of length $2b$ the minor axis.



1. [7 points] A solid has base the region enclosed by the ellipse with equation $x^2 + 4y^2 = 4$. Its cross sections perpendicular to the x -axis are half-ellipses with (horizontal) major axis twice as long as the length of the (vertical) minor axis.

(a) Make a sketch of the base region and a separate sketch of one of the cross sections along the x -axis.

(b) Find the volume of the solid.

2. Find the volume of the solid of revolution obtained by rotating the region enclosed by the graphs $\left\{ \begin{array}{l} f(y) = y^2 \\ g(y) = 1 \end{array} \right\}$ around the axis $x = -1$.

(Note: A sketch of the region may help you out here also.)