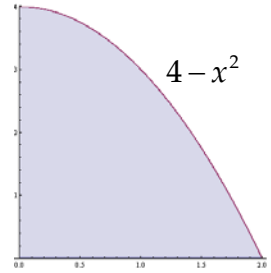


1) Consider the region pictured, bounded by the graphs of the functions $y = 4 - x^2$, $y = 0$, and $x = 0$. A solid of revolution is formed by revolving this region **about the x -axis**.



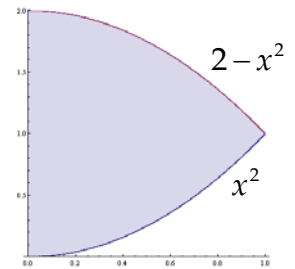
a) Which would you prefer to use to find the volume of this solid of revolution: the method of disks or the method of cylindrical shells? Briefly explain your choice/reasoning.

b) Set up an integral that gives the volume of this solid of revolution.

c) Evaluate the integral you set up in the previous part to find the volume of this solid of revolution.

d) If you had instead revolved the region about the y -axis, which solid of revolution would have the larger volume? Briefly explain or justify your answer. If you can, try not to evaluate a new integral.

2) Consider the region pictured, bounded by the graphs of the functions $y = 2 - x^2$, $y = x^2$, and $x = 0$. A solid of revolution is formed by revolving this region **about the y -axis**.



a) Which method would you prefer to use to find the volume of this solid of revolution: disks or shells? Briefly explain your choice/reasoning.

b) Set up an integral that gives the volume of this solid of revolution.

c) Evaluate the integral you set up in the previous part to find the volume of this solid of revolution.

3) Prove that the volume of a sphere of radius r is given by $V_{\text{sphere}} = \frac{4}{3}\pi r^3$. Recall that a circle of radius r centered on the origin is described by $x^2 + y^2 = r^2$.