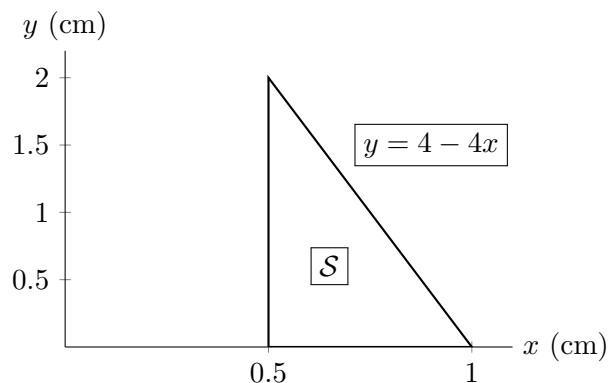


4. [4 points]

Let \mathcal{S} be the region bounded by the x -axis, the line $x = 0.5$, and the line $y = 4 - 4x$. This region is shown to the right. The units on both the x - and the y -axis are centimeters. A solid is obtained by rotating the region \mathcal{S} about the y -axis. The mass density of the resulting solid at each point y centimeters above the x -axis is $16y$ grams per cubic centimeter.



Write, but do **not** evaluate, an expression involving one or more integrals that gives the mass, in grams, of the resulting solid.

Answer: Mass = _____

5. [5 points] Prior to the start of an indoor winter carnival, the water tank for a dunking booth is being filled from a water hose at a rate of 8 gallons per minute. Unfortunately, once the tank has 50 gallons of water in it, the tank begins leaking water at a rate (in gallons per minute) that is proportional to the square root of the volume of water in the tank (in gallons) with constant of proportionality $k > 0$. Let $W = W(t)$ be the volume, in gallons, of water that is in the tank t minutes after the tank begins to leak. Write a differential equation that models $W(t)$ and give an appropriate initial condition.

Answer: Differential Equation: _____

Initial Condition: _____