8. [10 points] A solid $S$ is obtained by rotating the region bounded by the curve $y = 1 - x^2$, the line $x = 0$, and the line $y = 0$ around the $y$-axis. The density of the solid is given by $\delta(y) = 1 + y$.

a. [5 points] Write a definite integral that gives the mass of the solid $S$.

b. [5 points] Find formulas for $\bar{x}$ and $\bar{y}$, the $x$ and $y$ coordinates of the center of mass of the solid $S$. The formulas may be written in terms of definite integrals, which you do not need to evaluate.