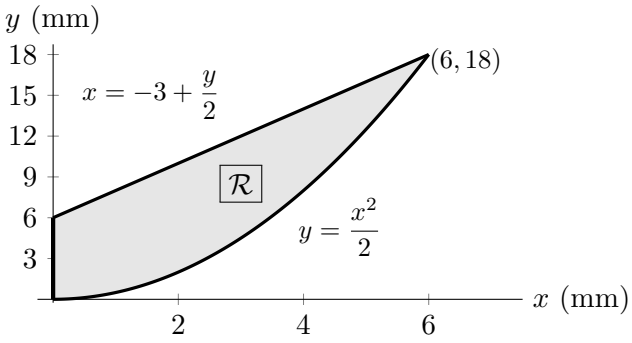
6. [12 points] Let $\mathcal{R}$ be the shaded region in the first quadrant shown below.

The region $\mathcal{R}$ is bounded by:

- the y-axis,
- the graph of $y = \dfrac{x^2}{2}$, and
- the graph of $x = -3 + \dfrac{y}{2}$.

The units on both axes are millimeters (mm).



a. [4 points] Write, but do NOT evaluate, an expression involving one or more integrals that gives the volume, in mm^3, of the solid whose base is the region $\mathcal{R}$ and whose cross-sections perpendicular to the x-axis are squares.

Answer: Volume = _____

b. [4 points] Write, but do NOT evaluate, an expression involving one or more integrals that gives the volume, in mm^3, of the solid formed by rotating the region $\mathcal{R}$ around the y-axis.

Answer: Volume = _____

c. [4 points] Write, but do NOT evaluate, an expression involving one or more integrals that gives the mass, in grams, of a thin plate in the shape of the region $\mathcal{R}$ that has mass density given by $\delta(x) = (1 + x^2)$ g/mm^2.

Answer: Mass = _____