Problem statement Suppose $R$ is the region in the plane bounded below by the curve $y = x^2$ and above by the line $y = 1$.

a) Sketch $R$. Set up and evaluate an integral that gives the area of $R$.

b) Suppose a solid has base $R$ and the cross-sections of the solid perpendicular to the $y$-axis are squares. Sketch the solid and find its volume.

c) Suppose a solid has base $R$ and the cross-sections of the solid perpendicular to the $y$-axis are equilateral triangles. Sketch the solid and find its volume.