MAT137

(Section L0501, February 03, 2020)

- **Fot today's lecture: slides 10.1**
- **For next day's lecture, watch videos 10.2, 11.1, 11.2 .**
- Contents: Volumes.

An equation for volumes by "slicing"

Let $a < b$. Let f be a continuous, positive function defined on $[a, b]$.

Let R be the region in the first quadrant bounded between the graph of f and the x-axis.

Find a formula for the volume of the solid of revolution obtained by rotating the region R around the x-axis.

Sphere

You know a formula for the volume of a sphere with radius R. Now you are able to prove it!

1. Write an equation for the circle with radius R centered at $(0, 0)$.
2. If you rotate this circle around the x-axis, it will produce a sphere. Compute its volume as an integral by slicing it like a carrot.

Pyramid

Compute the volume of a pyramid with height H and square base with side length L.

Hint: Slice the pyramid like a carrot with cuts parallel to the base.

Many axis of rotation

Let R be the region in the first quadrant bounded between the curves with equations $y = x^3$ and $y = \sqrt{32x}$.

Compute the volume of the solid of revolution obtained by rotating R around...

1. ... the x-axis
2. ... the y-axis
3. ... the line $y = -1$