

MAT 126.01, Prof. Bishop, Tuesday, Oct 6, 2020
Some HW 6 problems
Section 2.4, Arc length and surface area

HW 6, Prob 6, Part A:

Compute the area between the parabola $y = ax - bx^2$ and the x -axis.

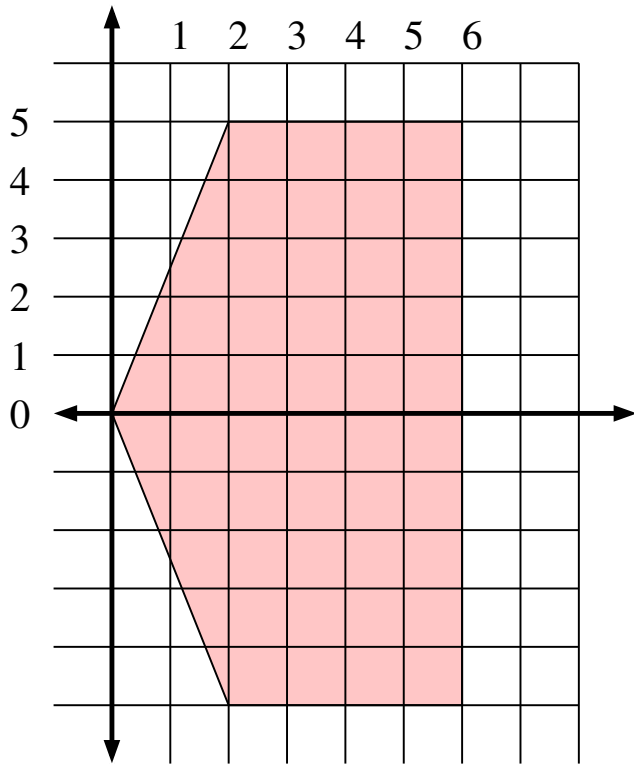
HW 6, Prob 6, Part B:

What is the slope of the line $y = tx$ that cuts this region into two equal area peices?

HW 6, Prob 11:

The base of a volume in the xy -plane is bounded by $x = -y^2 + 4y + 127$ and $x = y^2 - 26y + 179$. Every cross section perpendicular to the y -axis is a semi-circle. Find the volume.

HW 6, Prob 11: The base of a volume is shown. Suppose the cross sections perpendicular to the x -axis are squares. What is the volume?



Arclength: The arclength of the graph of f over $[a, b]$ is

$$\int_a^b \sqrt{1 + |f'(x)|^2} dx$$

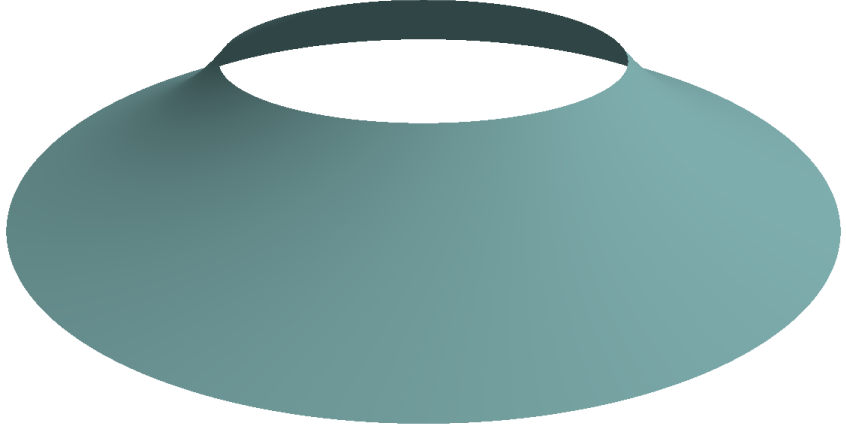
What is the arclength of graph of $\sin(x)$ between 0 and π ?

If f on $[a, b]$ is rotated around the x -axis, the surface area is

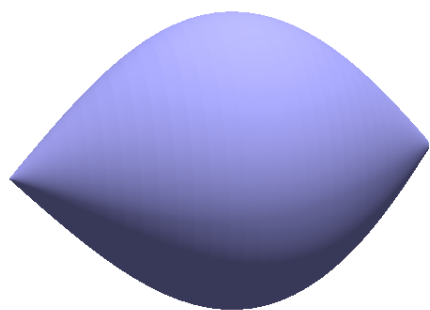
$$2\pi \int_a^b |f(x)| \sqrt{1 + |f'(x)|^2} dx.$$

If f on $[a, b]$ is rotated around the y -axis. The surface area is

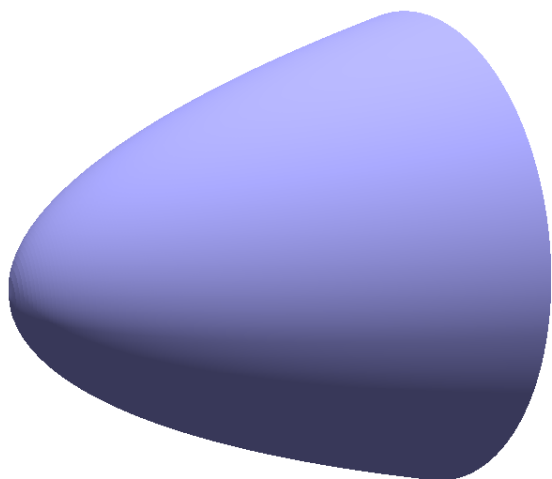
$$2\pi \int_a^b x \sqrt{1 + |f'(x)|^2} dx.$$



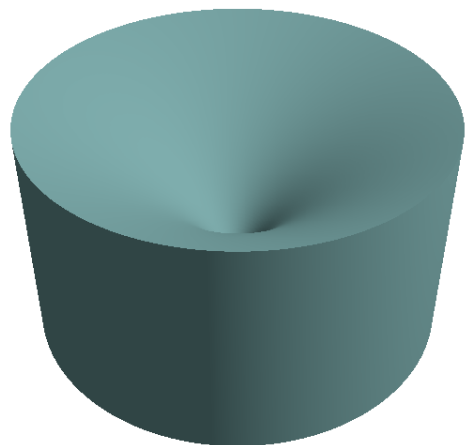
What is surface area when $\sin(x)$ on $[0, \pi]$ is rotated around the x -axis?



What is surface area when \sqrt{x} on $[0, 1]$ is rotated around the x -axis?



What is surface area when \sqrt{x} on $[0, 1]$ is rotated around the y -axis?



Which is larger: the area of \sqrt{x} on $[0, 1]$ rotated around the x -axis or the y -axis?

