

MA 16020 Lesson 14: Volume of solids of revolution III

Recall: Computing volumes of solids of revolution using
the disk method:

the washer method:

So far we have considered only rotations with respect to the x - or y -axis.
Today we consider more general axes.

Exercise 1. Compute the volume of the solid obtained by rotating the region enclosed by the curves $y = 3/x$, $x = 2$, $x = 5$ and $y = 0$ about the line $y = 2$.

Exercise 2. Compute the volume of the solid obtained by rotating the region enclosed by the curves $y = x^2$ and $y = 6x - 2x^2$ about the line $y = 5$.

Exercise 3. Compute the volume of the solid obtained by rotating the region enclosed by the curves $xy^2 = 144$, $x = 4$ and $y = 3$

(a) about the x -axis:

(b) about the line $y = 3$:

Exercise 3 (cont.). Compute the volume of the solid obtained by rotating the region enclosed by the curves $xy^2 = 144$, $x = 4$ and $y = 3$
(c) about the y -axis:

(d) about the line $x = -1$:

Exercise 4 (time permitting). The shape of a propane tank is obtained by revolving the interior of $4x^2 + y^2 = 100$ about the y -axis. What is the depth of propane in the tank when it is filled to $1/3$ of its capacity?