

# Calculus I

## Homework

### Volumes of solids of revolution

1.
  - (a) Consider the region bounded by the curves  $y = 2x^2 - x + 1$  and  $y = x^2 + 1$ . What is the volume of the solid obtained by rotating this region about the line  $x = 0$ ?
  - (b) Consider the region bounded by the curves  $y = 1 - x^2$  and  $y = 0$ . What is the volume of the solid obtained by rotating this region about the line  $y = 0$ ?
  - (c) Consider the region bounded by the curves  $y = x^2$  and  $x = y^2$ . What is the volume of the solid obtained by rotating this region about the line  $x = 2$ ?
  - (d) Set up BUT DO NOT EVALUATE an integral to calculate the volume of the solid obtained by rotating the region bounded by  $y = -x^2 + 2$  and  $y = 0$  about the given line.
    - The  $x$  axis.
    - The line  $y = -3$ .
  - (e) Set up BUT DO NOT EVALUATE an integral to calculate the volume of the solid obtained by rotating the region bounded by  $y = -x^2 + 1$  and  $y = 0$  about the given line.
    - The  $x$  axis.
    - The line  $y = -4$ .
2.
  - (a) Consider the region bounded by the curves  $y = \sqrt{x}$ ,  $x = 0$ ,  $y = 2$ . Use the method of cylindrical shells to find the volume of the solid obtained by rotating this region about the  $x$ -axis.
  - (b) Consider the region bounded by the curves  $y = x^2$  and  $y = 2 - x^2$ . Use the method of cylindrical shells to find the volume of the solid obtained by rotating this region about the line  $x = 1$ .