

The problems on this worksheet are for in-class practice during tutorial. You are free to collaborate and to ask for help. They don't count for course credit, but it's a good idea to make sure you know how to do everything before you leave tutorial – similar problems may show up on a test or assignment.

Note: your solutions to most of these problems are not going to fit on this page. (I hope you brought paper with you.)

1. For each of the following sets of curves, sketch the curves to determine the area they enclose, and then find the area.

(a) $y = \sqrt{x+2}$, $y = \frac{1}{x+1}$, $x = 0$ and $x = 2$.

(b) $y = 2x^2 + 5x - 3$ and $y = x^2 + 4x - 1$.

(c) $y = x^2 + 1$, $y = \frac{1}{4}(x-3)^2 + 1$, and $y = 1$.

(d) $y = \cos x$ and $y = \sin 2x$, between $x = 0$ and $x = \pi/2$.

(e) $y = x$ and $y = x^3$.

(f) $y = x$, $y = 5x$, and $y = 6 - x^2$, in the first quadrant.

2. Use calculus to find the following volumes:

(a) Of the solid S whose base is the region of the xy -plane bounded by $y = x^2$ and $y = 2 - x^2$, and whose cross-sections parallel to the y -axis are squares.

(b) Of a right circular cone whose height is 12 and base radius is 4.

(c) The region bounded by $y = 4 - x^2$ and $y = 0$, when rotated about

i. the x -axis.

ii. the line $y = -1$.

iii. the line $x = 2$.

(d) The region bounded by the curves $y^2 = x$ and $x = 2y$, when revolved around the y -axis.