# Homework 3

# Areas and Volumes

**Instructions:** You are encouraged to work out solutions to these problems in groups! Discuss problems with your classmates, the tutors and/or the instructors. After doing so, please write up your solutions legibly on a separate sheet (or sheets) of paper, showing all of your work (this part should be done on your own). When you are asked to give explanations, be sure to use complete sentences. You are welcome (and sometimes encouraged) to use calculators or computing devices.

Consider the two curves $y = (x-1)^2 + 1$ and $0 = y^2 - x - 2(y-1)$.

1. (1 Point) Draw the two curves in the xy-plane.

2. (2 Points) Compute the intersection points.

3. (2 Points) Compute the area between the two curves.

4. (2 Points) Compute the volume of the solid obtained by rotating the area in 3 around the x-axis.

5. (2 Points) Compute the volume of the solid obtained by rotating the area in 3 around the y-axis.

6. (1 Point) Are the two volumes in 4 and 5 equal? Why or why not?