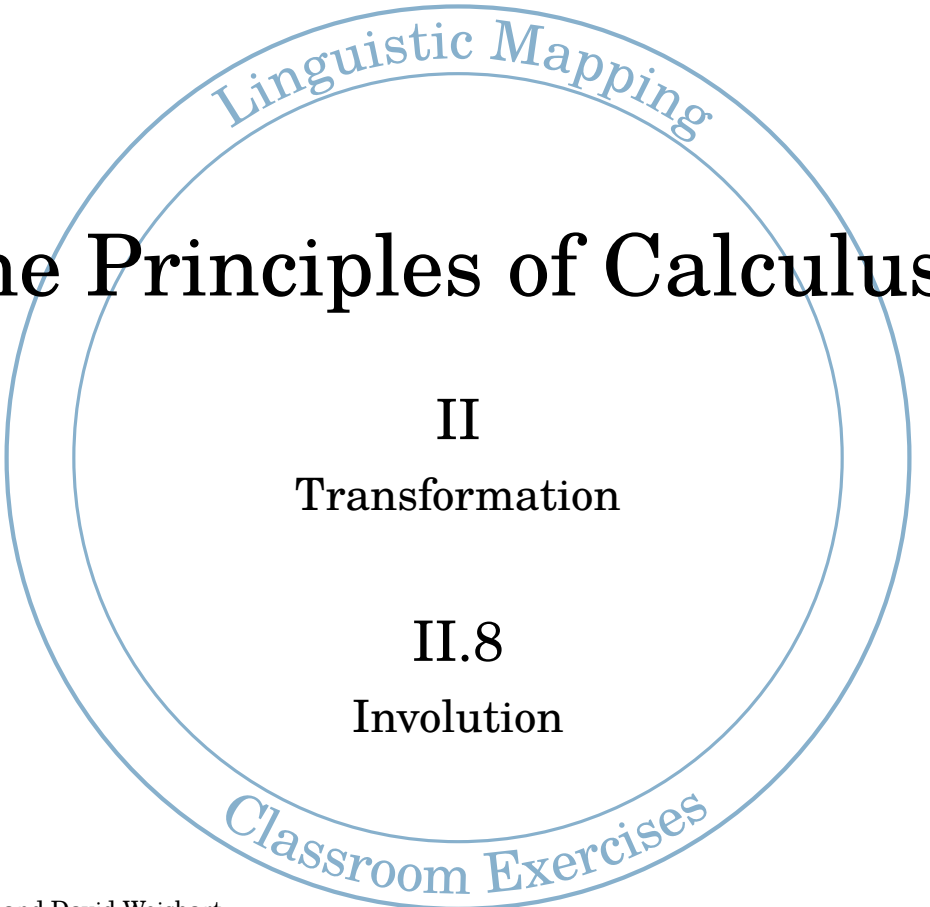



# The Principles of Calculus I

## II

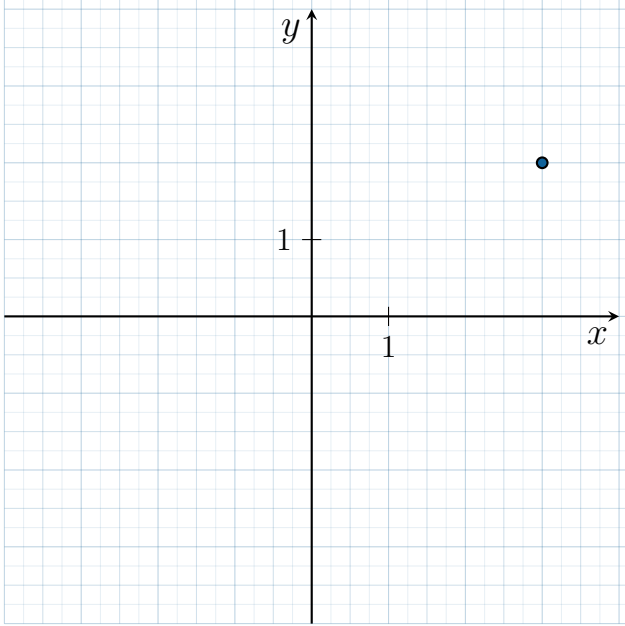
## Transformation

## II.8

## Involution

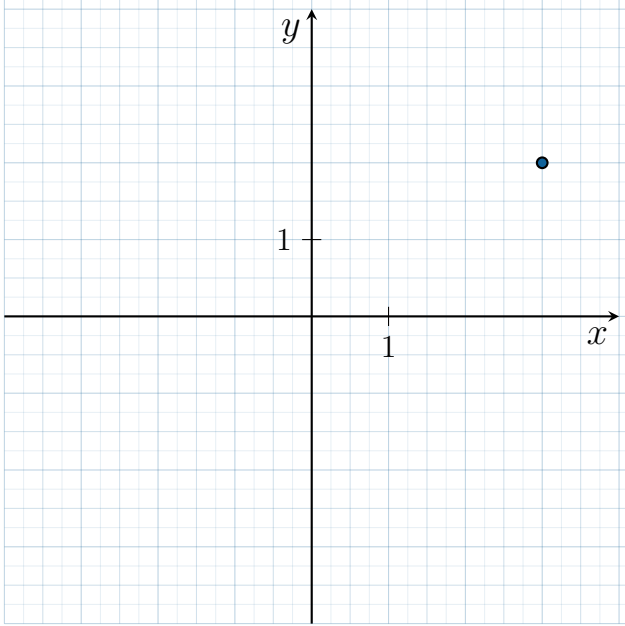
# Exercise 1

Describe in plain English what a reflection across the $x$-axis does to a point in $\mathbb{R}^2$, and provide a sketch to illustrate this action. What is the symbol that we choose to denote this transformation of the plane?



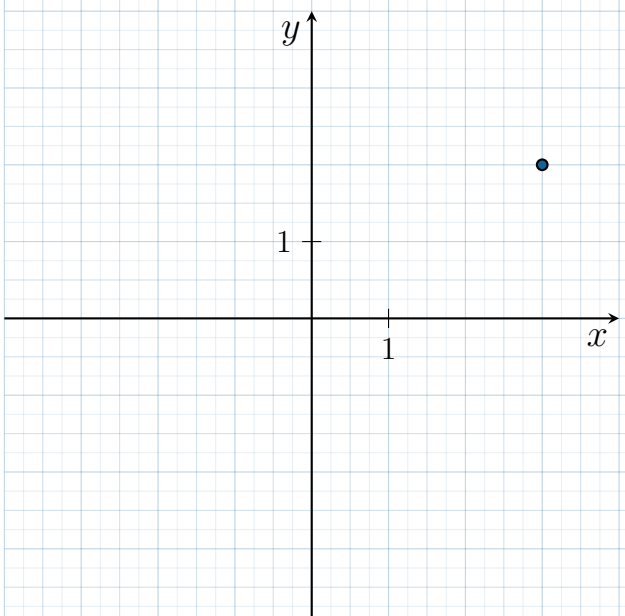
# Exercise 2

Describe in plain English what a reflection across the $y$-axis does to a point in $\mathbb{R}^2$, and provide a sketch to illustrate this action. What is the symbol that we choose to denote this transformation of the plane?



# Exercise 3

Describe in plain English what a rotation by half of a circle around $(0, 0)$ does to a point in $\mathbb{R}^2$, and provide a sketch to illustrate this action. What is the symbol that we choose to denote this transformation of the plane?

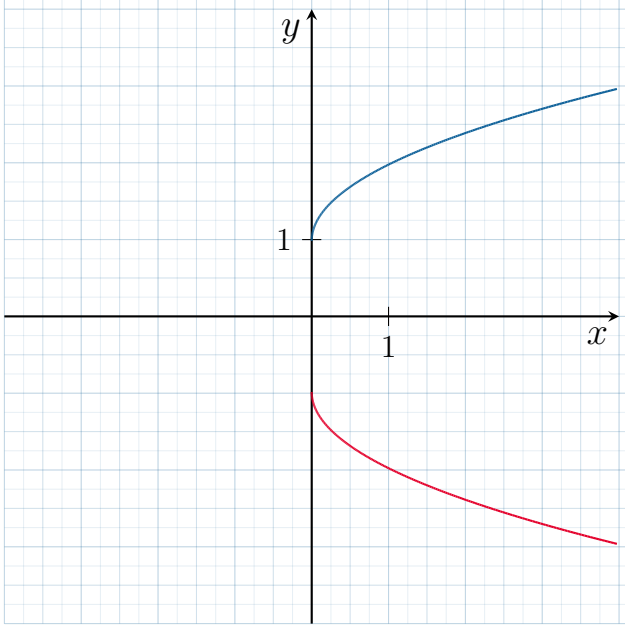


# Exercise 4

Take $f$ to be the function

$$f(x) = \sqrt{x} + 1.$$

Determine the way in which reflection across the $x$-axis transforms $f$. This is just an exercise in writing $f$ as a set, transforming each point in $f$, and renaming variables so that the left coordinate of the transformed function is written as an independent variable.

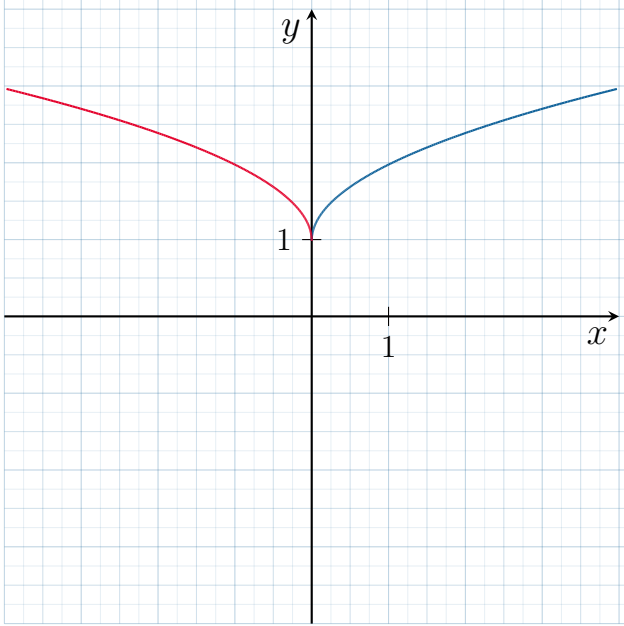


# Exercise 5

Take $f$ to be the function

$$f(x) = \sqrt{x} + 1.$$

Determine the way in which reflection across the $y$-axis transforms $f$. This is just an exercise in writing $f$ as a set, transforming each point in $f$, and renaming variables so that the left coordinate of the transformed function is written as an independent variable.

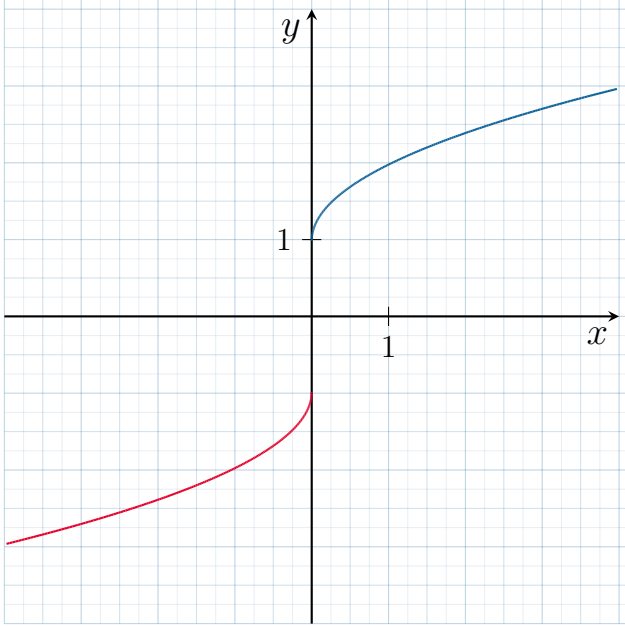


# Exercise 6

Take $f$ to be the function

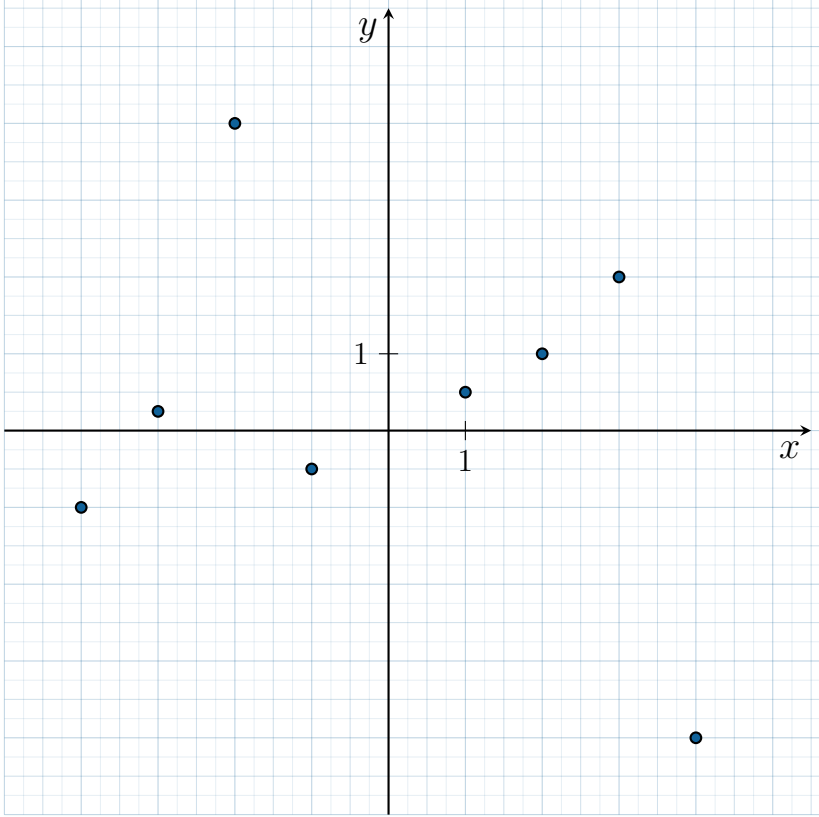
$$f(x) = \sqrt{x} + 1.$$

Determine the way in which rotation by half of a circle around $(0, 0)$ transforms $f$. This is just an exercise in writing $f$ as a set, transforming each point in $f$, and renaming variables so that the left coordinate of the transformed function is written as an independent variable.



# Exercise 7

Describe in plain English what an inversion of the $y$-axis does to a point in $\mathbb{R}^2$, and provide a sketch to illustrate this action. What is the symbol that we choose to denote this transformation of the plane? Is this operation defined on all of $\mathbb{R}^2$?



# Exercise 8

Take $f$ to be the function sketched below, and use a $y$-axis inversion to sketch the function $g$ that is given for any $x$ in the domain of $f$ at which $f(x)$ is not zero by

$$g(x) = \frac{1}{f(x)}.$$