# Homework 4

Math 252

Due May 5th at 11:59 PM

**Textbook Exercises**

**1.7:** 391, 393, 395, 397, 399, 401, 405, 411, 415, 423

**2.1:** 1, 3, 5, 7, 11, 15, 17, 21, 25, 27, 35

**2.2:** 73, 77, 81, 87, 89, 92, 95, 99, 101

**Exercise 1:** Find the area between the functions $f$ and $g$ on $[-1, 1]$, where $f(x) = \dfrac{1}{1+x^2}$ and $g(x) = x^2$. Sketch a graph.

**Exercise 2:** Consider the region in the $xy$-plane bounded by $y = \dfrac{1}{x+1}$, $x = 0$, and $y = x$.

a) Sketch a graph of the region.

b) Find the volume of the solid formed when the region is rotated about the $y$-axis.

c) Find the volume of the solid formed when the region is rotated about the $x$-axis.

**Bonus:** Given that the area of a circle is $\pi r^2$, use slicing to prove that the volume of a sphere is $\dfrac{4}{3}\pi r^3$.